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ABSTRACT

A study examined teacher-student interaction in Kentucky's secondary and postsecondary vocational education classrooms. It investigated whether sex bias or inequities were present and what might explain such differences. A literature review focused on studies conducted at different grade levels with relation to sex bias and classroom interactions. Individuals trained in classroom observation techniques observed 245 class sessions. Sixty-three secondary home economics, agriculture, business, and other vocational education classes and 22 postsecondary technical skills and support/core courses were observed. It was found that vocational teachers provided very little praise or criticism of students' work; 54 percent of secondary and 62 percent of postsecondary classrooms did not have a single incident of praise. Of 579 conduct-related interactions, 3 were to praise the student; 520 were to remediate or criticize. Males consistently received a disproportionate number of interactions; the disparity was greater in secondary classrooms. Postsecondary teachers interacted with significantly less criticism. Greater equity existed in postsecondary classrooms. Teacher gender did not appear to affect interaction. The only teacher characteristic that was related to interaction with students was previous training in classroom interaction strategies. (Seventeen data tables are provided. Appendixes include 44 references; correspondence; teacher data form; observation instruments; and 22 data tables.) (YLB)

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Teacher/Student Classroom Interaction In Vocational Education

A Sex Bias/Sex Stereotyping Project
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ABSTRACT

The findings reported in this document are the results of a two-year research project designed to investigate how teachers interact with students in secondary and post secondary vocational education classrooms in Kentucky. It has been proposed in earlier research studies of interaction patterns that the nature of the student-teacher interaction contributes to an interaction-biased classroom.

Sadker and Sadker (1984, 1986) classify students into two major groups, "interaction-rich" and "interaction-poor," and have determined that students in the same classroom, with the same teacher, studying the same material, can experience very different educational environments. Their research, conducted on classroom interactions in elementary and secondary schools, and in institutions of higher education has revealed that these groups of students have something in common, their sex. Male students tend to receive a disproportionate share of the teacher's attention; most "interaction-rich" students were male. Also, the type of interaction was found to be sex-related. Interactions involving positive and precise feedback were more likely to be directed at male students. In other words, teachers were found to be operating in a sex-biased classroom situation, at least potentially affecting the learning opportunities for some students.

Sadker and Sadker (1986) also found that teachers infrequently praise or criticize students, but usually simply accept student comments. This high rate of acceptance creates classrooms which they categorize as "flat, bland, and unexciting."

Are vocational classrooms the same or different from those characterized by earlier research in general education settings? This research was designed to ascertain the level and type of teacher-student interaction taking place in Kentucky's secondary and post-secondary vocational education classrooms.

A cadre of individuals was trained in classroom observation techniques. A total of 245 class sessions were observed. The observers noted many factors, including who initiated the interaction, the type of interaction, and the sex of the student.

Major findings are among the following:

1. Vocational teachers provided very little praise or criticism of their students' work. ("Bland" acceptance prevailed)

2. Fifty-four percent (54%) of the secondary classrooms and 62 percent of the post-secondary classrooms did not have a single incident of praise.

3. Of 579 conduct-related interactions, only three (3) were to praise the student; 520 were to remediate or criticize the student.

4. Males consistently received a disproportionate number of interactions, but the disparity was greater in secondary classrooms.

5. The least disparity for secondary was in Agriculture classrooms; the most in Home Economics.

6. Teacher-student interactions in the post-secondary setting occurred with one-third less frequency than in the secondary setting.

7. Post-secondary teachers interacted with significantly less criticism than did secondary teachers.

8. Overall, greater equity existed in post-secondary classrooms. However, inequity in the support type post-secondary classes was similar to the secondary classrooms.

9. Females in the post-secondary technical classrooms received proportionally more remediation and criticism than males, thus being treated more like males in general. This finding is what contributed most to the more equitable post-secondary interactions.

10. There were no significant differences found for the interactions of male and female teachers. Both groups were biased toward male interaction.

11. Both male and female teachers gave significantly more criticism per male student than female student.

12. No differences were observed in interaction patterns and the teachers' years of teaching experience.

13. The education level of the teacher was not related to classroom interactions.

14. Work experience outside education was not related to how the teachers interacted with students.

15. Teachers across the various vocational areas displayed similar interaction patterns.

16. Previous training in classroom interaction strategies was significantly related to classroom behavior, with trained teachers more consistently providing an equitable classroom environment.

All in all, one must conclude that Kentucky's vocational education teachers displayed behaviors similar to elementary, secondary, and post-secondary academic teachers from other studies. They praised and criticized intellectual ability very little; they accepted and remediated a great deal; and their interaction behaviors were disproportionately directed at male students.

However, although these findings appear essentially negative, a positive and significant finding was observed. Previous training in classroom interaction strategies was significantly related to classroom interaction equity. It would appear that teachers can learn to be more equitable in their interactions with male and female students.

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The project director wishes to express his appreciation to a number of individuals who contributed to the completion of this research project.

First, without the cooperation of state vocational personnel, 19 local school districts, the state vocational-technical schools, and 85 vocational teachers, this research would have been impossible. We received great support from administrators and were welcomed into classrooms on nearly 250 occasions for observation and data collection.

Classroom observation required trained classroom observers. Observers committed themselves to a three-day trip to Washington, D.C., to receive training from Drs. David and Myra Sadker at American University. The observers included: Ms. Carol Groppel, Dr. Helen Harrah, Dr. Larry Kelsch, Dr. Ronald Hickey, Mr. Michael Hicks, Dr. Ron Powell, Ms. Marcia Robertson and Dr. Douglas Smith.

The project spanned two years. Dr. Ron Powell is recognized for his assistance in project coordination for year one, and Dr. Debbie Boone for her help in coordination and report preparation during year two.

The data were, to say the least, extensive. Three individuals were especially helpful in organizing and analyzing the data, including: Mr. Ralph DeLapp, Dr. Paul deMesquita and Mr. Emmanuel Okorley.

Finally, JoAnn Omvig is recognized for the many hours she spent typing the first and second year project reports, and Anne Mills and Phyllis Dedman for typing the appended tables of data analyses.

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INTRODUCTION

Although good classroom communication is necessary for enhanced learning and positive attitudes by students toward schools (Goodlad, 1984), the fact remains, that student-teacher interactions are missing, or improperly biased in many classrooms. Some students treat classroom discussions as a spectator sport and do not interact, while others are active participants. Sadker and Sadker (1986) have identified these two groups of students as "interaction-poor" and "interaction-rich."

While it is true that some students are the cause of non-participation, it is also true that a great many teachers are unconsciously contributing to an interaction-biased classroom. Many teachers are unaware of their sex bias in classroom discussions with students. Sadker and Sadker' (1984) study of classroom interactions determined that students in the same classroom, with the same teacher, studying the same material, were often found to be experiencing very different educational environments. Research has shown that approximately one-fourth of the elementary and secondary students do not interact with the teacher at all during class. The majority of students fell into a second group which typically had one interaction with the teacher per class. The students in these two groups are considered to be "interaction-poor." A third group, which consisted of less than 10% of the students comprised the "interaction-rich" group. The "interaction-rich" students participated in more than three times their share of interactions with the teacher (Sadker & Sadker, 1986).

Research conducted on classroom interactions in elementary and secondary schools, and in institutions of higher education has revealed that these groups of students have something in common - their sex. Male students tend to receive a disproportionate share of the teacher's attention; most interaction-rich students were males. Also, the type of interaction with the teacher was found to be sex-related. Interactions involving positive and precise feedback were more likely to be directed at male students.

National measures of academic progress (National Assessment of Educational Progress and Scholastic Aptitude Tests) support the view that girls and boys are experiencing different educational environments. The scores girls achieve in the early grades on the standardized tests are generally equal to or better than scores of the boys. However, by the end of high school, boys score higher on the national measures. If the most valuable resource in the classroom is the attention of the teacher, then it should be no surprise when boys show greater educational gains (Sadker & Sadker, 1986). Research has shown that male students in a classroom receive as much as three times the verbal reinforcement and teacher interactions as female students regardless of the teacher's gender.

Sadker and Sadker (1986) also found that teachers infrequently praise or criticize students, but instead usually simply accept student comments. This high rate of acceptance has created classroom environments which they categorize as "flat, bland, and unexciting."

Bland and biased classrooms provide much cause for concern. Many teachers are unaware of the importance of precise, equally delivered classroom interactions, and most are untrained in classroom interaction skills. Teachers need appropriate and precise training in unbiased classroom interaction skills, provided as inservice education and/or as a part of their teacher education courses. Bias in classroom interactions by the teacher can inhibit student achievement and classroom quality.

Purpose

The purpose of this project was to ascertain the level and type of teacher-student interaction which exists in Kentucky's secondary and post-secondary vocational education classrooms. Previous research has established a data base for interaction patterns in general education classrooms, but no research was found that studied vocational education classes. The findings from this study will be compared with previous research in an effort to identify similarities and differences which exist in vocational education classrooms.

Significance

The findings of this study will have implications for teacher inservice programs as well as for teacher education programs by providing a basis from which classroom interactions between both male and female students with secondary and post-secondary vocational education teachers can be ascertained. Administrators can utilize the results from this

study in the development of teacher evaluation and classroom improvement models. Few teachers or administrators are aware of the overwhelming discrepancy which exists in teacher-student classroom interactions which are a result of the students gender. An increased awareness among educators and administrators alike with regard to this issue will be a major accomplishment of this study.

Teacher education institutions can utilize the findings of this study to modify their existing programs in an effort to work toward alleviation of sex-biased classrooms. Teacher education programs should include training in equitable and appropriate interaction with students in the classroom.

Research Questions

This research study sought to identify and answer the following:

1. Do differences exist in the interaction levels between secondary vocational education teachers and the male and female students in their classrooms?
2. Do differences exist in the interaction levels between post-secondary vocational education teachers and the male and female students in their classrooms?
3. If differences do exist in secondary vocational education classrooms, in what categories of interaction are they found, i.e., praise, acceptance, remediation, or criticism?
4. If differences do exist in post-secondary vocational education classrooms, in what categories of interaction are they found, i.e.,

praise, acceptance, remediation, or criticism?

5. What differences in teacher-student interactions exist by type of secondary vocational classroom--agriculture, business and home economics and how do the categories of interaction vary within the types of vocational classrooms?
6. What differences in teacher-student interactions exist by type of post-secondary vocational classroom--technical and support courses and how do the categories of interaction vary within the types of vocational classrooms?
7. Are teacher characteristics such as gender, years of teaching experience, education level, certification, business/industry work experience, or presence of any special training in classroom interaction strategies related to interaction differences between male and female students in secondary and/or post-secondary classrooms?

Limitations

This study was limited by restrictions in the population, the instruments used, and the uncontrollable variables. Because this study focused on secondary and post-secondary vocational classes in Kentucky, the number of observable classes was automatically limited to the number of courses offered during the semester of observation, and the number of classes which had lecture type instruction periods.

The data were collected by eight researchers. Even though training and inter-rater reliability scores for these were determined to be

adequate, the possibility exists that each individual's perceptions might differ from situation to situation.

Visitation schedules to the various classrooms varied with the researcher. The time occurring between visits was not the same for all classes. Example: some were scheduled a few days apart; others occurred with up to two-week intervals.

Finally, because the observer represented a "third party" in the classroom, teacher/student behavior might have varied from what would have been normal class settings.

REVIEW OF LITERATURE

To acquire a knowledge on the status of research related to sex bias in teacher-student classroom interaction, a review of literature was conducted. The focus of review on studies conducted at different grade levels from elementary to post-secondary with relation to sex bias and classroom interactions.

Elementary Classrooms

There has been much conjecture about when and how sex-role stereotypes develop. In their 1975 study of nursery schools Serbin and O'Leary found that teachers act and react in different ways to boys and girls, and concluded that teachers subtly encourage stereotypical behavioral patterns. They also found that elementary teachers were more likely to provide extended directions to their male students in order for them to complete the task independently. However, when female students required assistance, the teacher was more likely to do the task for them rather than give the type of instruction that would allow for independent work.

Goodlad (1984) has found that when students participate in classroom discussion they are more likely to have a more positive attitude toward school, and positive attitudes have been found to enhance learning. In Sadker and Sadker's (1984) study of fourth, sixth and eighth grade students, it was found that male students were involved in more interactions than females in all subjects observed. Female students

consistently received less attention from teachers than their male counterparts. The sex and/or race of the teacher did not influence the interaction patterns.

Although there is no sex difference in general intelligence, girls achieve more than boys, especially in the early grades, in reading and other verbal skills (Maccoby, 1966). According to Maccoby (1966), intellectually girls start off ahead of boys. They begin speaking, reading and counting sooner; in the early grades they are even better in math. However, during the high school years, a different pattern emerges and girls' performance on ability tests begins to decline. Frazier and Sadker (1973) reported that when elementary boys and girls have similar IQs, the girls are more likely to receive higher grades than the boys. Additionally, most grade repeaters are boys. Some attribute this to biological differences. However, the arguments that boys are biologically less able to adapt to school has been refuted by cross-cultural data from other countries showing that the above cited sex differences do not exist or may even be reversed in other countries (Brophy & Good, 1974).

Dweck, Davidson, Nelson and Enna (1978) found that there were sex differences in a pattern of behavior called "learned helplessness." Learned helplessness is defined as a situation where failure is perceived as insurmountable. Students who exhibit learned helplessness attribute failure to factors that they cannot control, for example, lack of ability. Students who are characterized by learned helplessness are

likely to show further deterioration in performance following negative evaluations. In contrast, children who approach various factors as being ones which they can do something about, tend to see failure as surmountable and often will show improved performance.

Girls were found to be more likely to exhibit learned helplessness than boys and were more likely to blame poor performance on a lack of ability rather than a lack of effort. They were also "more likely to show decreased persistence or impaired performance following failure, the threat of failure or increased evaluative pressure" (Dweck et al., 1978).

Sadker and Sadker (1984) noted that while the research was far from conclusive, studies suggest that teacher' evaluative feedback regarding the intellectual quality of academic work may be a factor in causing sex differences in learned helplessness. In their observations of fourth and fifth grade classrooms, Dweck and her colleagues (1978) found that approximately 90 percent of the praise boys received for their academic work was directed at intellectual competence. In contrast for girls, only 80 percent of the praise they received for academic work was for intellectual competence. The remaining 20 percent of the praise girls received focused on neatness of their paper and for following the rules of form.

The sex differences were found to be even more striking in terms of work-related criticism. Approximately half of the work-related criticism boys received was for intellectual inadequacy, the remaining work-related criticism was from failure to obey the rules of form. On the other hand,

almost 90 percent of the work-related criticism received by girls was specifically directed at intellectual inadequacy, girls received little criticism pertaining to violation of rules of form (Dweck et al., 1978). Spaulding's (1963) study of twenty-one fourth and sixth grade classes found the emergence of a similar pattern. The boys received more total blame and disapproval, which was largely for inappropriate conduct. The girls, however, received almost twice as much disapproval for lack of knowledge or skill as did the boys. A similar pattern also emerged from a study by Bossert (1981) in which he found that boys received less task-relevant feedback, fewer criticisms on work quality, and more praise for intellectual competence.

Sadker and Sadker (1984) found several research studies (Jackson & Lahaderne, 1967; Meyer & Thompson, 1963; and Lippit & Gold, 1959) that have shown teacher disapproval contacts for classroom behavior is most often directed at male students, and that teachers reprimanded boys more often and more harshly than girls. A possible explanation of sex differential patterns in classroom management advanced by Sadker & Sadker (1984) "is that socialization patterns cause boys to misbehave more in schools and, consequently, males are deserving of negative teacher attention." However, they indicated that "one study of 15 preschool classrooms showed that when teachers were faced with disruptive behavior, particularly aggressive behavior from both boys and girls, the teachers were over three times as likely to reprimand the boys as the girls" (Sadker & Sadker, 1984, p. 6).

Serbin, O'Leary, Kent, Tonick (1973) found that teachers tend to reprimand boys in public and in a loud voice. When they did reprimand girls they did it quickly and quietly in a way that other members of the classroom could not hear (Sadker & Sadker, 1984).

Sadker and Sadker (1984) noted that an interesting pattern emerged from the observational literature that was also reflected in comments teachers make about students in interviews. Content analysis of these comments indicated far more personal involvement with male than with female students. Boys also received more negative comments than girls in the areas of sloppy work, not trying hard enough, and classroom misbehavior (Jackson, Silberman & Wolfson, 1969).

Since the passage of Title IX of the Education Amendments of 1972, it has been against the law to separate students on the basis of sex in courses and extracurricular activities. However, sex segregation remains in the classroom, particularly at the elementary and middle school levels (Maccoby & Jacklin, 1974). Sometimes teachers create this segregation by categorizing students on the basis of forming boy and girl lines, teams for contests, and groups for class assignments (Frazier & Sadker, 1973). Sadker & Sadker (1986) suggest that sex segregation may be part of the problem of why males capture more and better teacher attention. Another explanation they advanced was that boys demand more attention; their research revealed that boys in elementary and secondary schools were eight times more likely as girls to call out and demand the teachers' attention.

According to results reported by Lockheed, Finkelstein, and Harris (1978), male students were assigned more leadership roles in the classroom by the teacher, which also may influence peer groups. Sadker and Sadker (1984) noted that children tend to self-select into the same sex peer groups even when teacher interference does not take place. Ten-to-twelve year olds sorted themselves into gender-segregated groups whenever the opportunity arose (Clement & Eisenhart, 1979). Sheridan (1978) discovered that teachers were not always aware of their discrimination. He found that 85.5 % of the teachers believed they did not assign duties or activities on the basis of sex. However, their students, especially the girls, perceived more stereotyping in activities relative to their individual sex. This tendency for sex stereotyping in activities increased with grade level.

Junior High/Secondary Classrooms

Research in this area has not been as extensive as that conducted at the elementary level. Sikes (1971) in a study of junior high schools showed that boys received more academic contacts and they were asked more direct questions; more open-ended questions; and more complex and abstract, higher order questions than were girls. In a similar study conducted at the secondary level, boys were asked more direct questions and more open-ended questions; they received more teacher initiated contacts and more total positive teacher-student contacts (Jones, 1971).

Another study by Good, Sikes and Brophy (1973, p. 83) found that teachers of either gender exhibited the same types of sex bias. "Male

and female teachers treat male and female students similarly. Male and female students are not treated the same way, since important student sex differences appear regularly. However, the present data show that the same kind of sex differences that have been repeatedly demonstrated to exist in classes taught by female teachers also exist in classes taught by male teachers." Good and colleagues (1973) found that high-achieving males, relative to other students, received the most favorable teacher treatment; while low-achieving boys had the poorest contact patterns with teachers. Low achieving girls also had a relatively poor pattern of teacher contact. So, the pattern expands. Being a boy and being bright can almost certainly assure more favorable teacher contact.

Ricks (1973) conducted a survey of 60 secondary teachers and found that the data revealed that teacher perceptions and attitudes toward sex roles were traditional. The data also revealed that teachers tend to perceive boys as active and girls as passive and tend to feel that boys and girls expect differential treatment along traditional lines. This study also suggested that both male and female teachers have a preference for maleness.

Post-secondary Classrooms

The research pertaining to sex bias in teacher-student classroom interaction at the post-secondary level indicates that more active teacher attention continues to be directed toward male students even at this level (Karp & Yoels, 1976; Parker, 1975; Sternglanz &

Lyberger-Ficek, 1977). Thomas (1983) in her research found that female students had fewer interactions than expected. As the academic year progressed this inequity in favor of males tended to increase. Thomas also found that there was approximately one-third less teacher-student classroom interaction at the post-secondary level than at the elementary-secondary levels; and that students self-segregate on the basis of gender to a high degree in their choice of classroom seating.

Not only is there less classroom interaction at the post-secondary level, but four or five students account for over 50 percent of the total classroom interactions in post-secondary classrooms (Karp & Yoels, 1976). Sadker and Sadker (1986) from their observations of college classrooms also reported that the overall amount of interactions decreased and the number of silent students increased. In comparison to a 1984 elementary study by Sadker and Sadker in fourth, sixth, and eighth grade classes, where 25 percent of the students were silent; in college this increased to 50 percent. The "okay" classroom was very prevalent at the post-secondary level. There were more interactions of acceptance (boring) than praise, criticism, and remediation combined.

According to Karp and Yoels (1976) the avoidance of direct personal confrontation between teacher and student is a typical pattern in college classrooms. In fact, their findings indicate that post-secondary teachers rarely call on specific students, but tend to direct questions to the whole class.

In Long's (1986) study the typical classroom had one interaction per minute, with males receiving more interactions than expected. Also approximately 25 percent of all interactions came from the salient students who were just ten percent of the class. Forty-five percent of the students remained silent; the other 45 percent of the students interacted with the instructor one or two times. Descriptive statistics indicated that salient students were more often males and that silent students are usually females.

Sadker and Sadker (1981), in a study of 24 leading teacher education college texts, reported that twenty-three of the texts analyzed gave less than one percent of the space to the issue of sexism. One-third of the texts did not mention the issue of sexism at all. The math and science texts were most guilty of this oversight, and these represented areas in which girls were most likely to have achievement difficulties. Not a single text provided future teachers with instructional strategies to counteract sexism in the classroom. In another disturbing note, Long (1986) reported that only 62 words were devoted to the subheading "Eliminating Sexual Bias" in a newly published text on middle school and secondary teaching methods. The authors stated, "Your own good judgment should be sufficient to guide you in this aspect of your teaching" (Clark & Starr, 1986, p. 339).

Since the passage of Title IX in 1972, there has been greater equity between males and females regarding admission to post-secondary education. Women's gains in access to higher education and their

progress can be documented in terms of the number receiving college degrees each year (Hall & Sandler, 1982). Other studies, however, have indicated that women were still being admitted less often to colleges and universities even though they have achieved the same academic standing as men (Astin, Harway & McNamara, 1976; Walster, Clearly & Clifford, 1976). It has also been shown in some studies that women who do attend college earn higher grades than their male counterparts (Bayer, Drew, Astin, Boruch & Creager, 1970; Davis, 1964).

Boersman, Gay, Jones, Morrison and Remick (1981) did not find praise to make a difference in student behavior or achievement since so little was lauded out by either male or female professors.

Three research studies conducted in the mid-seventies indicated that male faculty tended to affirm students of their own sex more than female students and often perceived female students primarily as sexual beings who were less capable and serious than male students (Heyman, 1977; Hochschild, 1975; Tidball, 1976). College teachers were also found to be more likely to devalue academic work performed by female students (Shapiro, 1980) and seldom referred to or expanded on women's ideas and contributions (Karp & Yoels, 1976). Another post-secondary study suggested that women students were more likely to doubt their abilities and attribute their success to hard work or luck to skill and competence (Erkut, 1979).

Summary

Most classroom interaction studies have been conducted at the elementary level; however, studies of elementary, secondary and post-secondary classrooms all indicate that more active teacher attention is directed at the male students and that teachers prefer maleness. Researchers have also found that, at the post-secondary level, this inequity in favor of the male increases as the year progresses.

The "okay" classroom appears to be most prevalent throughout the various levels of education--elementary, secondary and post-secondary. There were typically more interactions of acceptance than praise, criticism or remediation combined.

As we look at secondary and post-secondary vocational education classrooms through this research, we will attempt to ascertain whether these trends hold true in vocational education settings as they appear to in other academic settings. Thomas (1983) found that there were approximately one-third less teacher-student classroom interactions at the post-secondary level than at the elementary and secondary levels of academic classrooms, will this difference hold true for secondary and post-secondary vocational classrooms?

PROCEDURES

The purpose of this study was to examine classroom interaction patterns of vocational education classrooms to ascertain if sex bias or inequities are present and to attempt to determine what might explain such differences if they are found to exist. The population and sample, instrumentation, instrument validity and reliability, data collection procedures, and data analysis procedures are described in this section.

Populations and Samples

The populations under investigation included all secondary and post-secondary vocational classes in Kentucky. The samples for the two different populations were selected by two different selection procedures. The data for the secondary vocational classes were collected during the 1987-88 school year; data for the post-secondary classrooms were collected during the 1988-89 school year.

Secondary Sample

The sample for the study of secondary vocational education classrooms was derived through the use of stratified random sampling. Based on the actual number of classes by program area, it was determined that the sample should include a proportionate percentage of classes by program area: 20 percent home economics, 20 percent agriculture, 40 percent business, and 20 percent other vocational education classes.

The list of secondary vocational education classrooms which were observed was derived using the following procedures:

1) The state was divided into four multi-county regions.

2) All high schools in each region were identified.

3) The high schools in each region were divided into thirds, by size of the student population.

4) Five schools per region - 2 large, 2 medium, and 1 small - were randomly selected.

5) The selected schools were checked in regard to programs offered and student population gender mix (male/female).

6) Schools that did not meet the criteria of gender-mixed classes were dropped from the study and another random selection was made to replace that school.

7) Twenty schools were eventually selected.

8) Letters, in which the project was described, were sent to the school superintendents and their participation was requested. (See Appendix A)

9) Nineteen of the 20 superintendents agreed to participate, and designated a contact person for the research staff.

10) A form was completed for each teacher selected which included class name, time taught, and male/female mix of students. (See Appendix B)

11) These forms were analyzed and a final selection of 62 classrooms was made.

12) The 62 classrooms were divided among seven trained observers for data collection purposes.

Post-Secondary Sample

A purposeful sampling procedure was used to select participating classrooms at the post-secondary level. There are fourteen State Vocational-Technical regions in the state of Kentucky. Participating class-

rooms were selected by the following method:

1) Phone calls were made to all vocational regional directors explaining the study and requesting their assistance.

2) Follow-up letters were sent to each regional director and school principal requesting assistance in supplying the necessary information or the name of a contact person for the project staff to work with (Appendix C).

3) Thirteen of the districts responded. Two indicated that they would not have anything available during the time period of the study, one did not have classes which met the 30/70 minimum ratio for gender mix and all three were dropped from the study.

4) Ten post-secondary vocational regions were selected for observation purposes.

5) Phone calls were made to designated contact persons at each of the identified state vocational/technical schools to determine which classes having the minimum 30/70 gender mix ratio met in lecture type situations and to schedule observation times. The school contact person or the research staff made final observation arrangements directly with the classroom instructor.

6) Twenty-two classrooms were divided among five trained observers.

Demographics of the Populations

A summary of the distribution of classes observed by school type and program area is shown in Table 1. A total of 84 teachers were involved in the entire study. Sixty-two of the teachers taught vocational education classes at the secondary level and twenty-two teachers taught at the post-secondary level. The secondary courses observed consisted of 14 home economic classes, 9 agriculture, 31 business and 9 other types of vocational education classes. The post-secondary courses observed consisted of 13 technical skills courses and 9 support/core courses. All

Table 1

Distribution of Classes Observed by School Type and Vocational Education Program Area

Vocational Education Area	Teachers No.	Teachers %	Class Sessions Observed No.	Class Sessions Observed %
Secondary				
Home Economics	14	22.2	40	22.0
Agriculture	9	14.3	26	14.3
Business	31	49.2	91	50.0
Other	9	14.3	25	13.7
Secondary Total	63	100.0	182	100.0
Post-Secondary				
Technical	13	59.1	39	61.9
Support	9	40.9	24	38.1
Post-Secondary Total	22	100.0	63	100.0
Study Totals	85	100.0	245	100.0

teachers taught within one vocational education area with the exception of one secondary teacher who taught two classes of Consumer Economics (Business) and one class of Consumer Education (Home Economics) and therefore appears in Table 1 twice, making the table total to be 85 teachers.

Thirty-six of the teachers in the study were male, 26 taught at the secondary level and 10 in post-secondary classrooms (Table 2). Females accounted for 48 of the teachers in the study, 36 taught in secondary classrooms and 12 at the post-secondary level.

Table 2

Gender Distribution of Teachers

Gender	Secondary		Post-Secondary		Totals	
	No.	%	No.	%	No.	%
Male	26	41.9	10	45.5	36	42.9
Female	36	58.1	12	54.5	48	57.1
Total	62	100.0	22	100.0	84	100.0

Nearly 21% (18) of the teachers had 20 years or more of teaching experience, the majority of which (13) taught at the secondary level and 5 were post-secondary classroom instructors (Table 3). Forty-six percent (39) of the teachers in the study had 10-19 years of teaching experience, 31 taught at the secondary level and 8 at post-secondary. The remaining 32% (27) had nine years or less of teaching experience, 9 taught post-secondary classes and 18 taught secondary vocational classes.

Table 3

Frequency Distribution of Years of Teaching Experience of Teachers

Years	Secondary		Post-Secondary		Totals	
	No.	%	No.	%	No.	%
1-9	18	29.0	9	40.9	27	32.1
10-19	31	50.0	8	36.4	39	46.4
20 and over	13	21.0	5	22.7	18	21.5
Total	62	100.0	22	100.0	84	100.0

The distribution of the educational levels of the teachers (Table 4) in the study varied from four teachers at the post-secondary level who had only Industrial Certification to one in the secondary vocational school who was a Specialist in Education. Fourteen of the teachers had earned at least a Bachelor of Arts or Bachelor of Science degree, with four of those having earned additional hours beyond the degree. A Master of Art or a Master of Science degree had been earned by 39 of the teachers, 7 of whom had earned hours beyond the Master's degree. Twenty-six of the teachers had earned Rank I in the Kentucky Educational System, with 7 having exceeded Rank I qualifications.

Table 4

Frequency Distribution of Educational Level of Teachers

Educational Level	Secondary No.	Secondary %	Post-Secondary No.	Post-Secondary %	Total No.	Total %
Industrial Certificate	0	0.0	4	18.2	4	4.8
BA/BS (Rank III)	6	9.8	4	18.2	10	12.0
BA/BS Plus	2	3.3	2	9.1	4	4.8
MA/MS (Rank II)	22	36.1	9	40.9	31	37.3
MA/MS Plus	6	9.8	1	4.5	7	8.4
Rank I	18	29.5	1	4.5	19	22.9
Rank I Plus	6	9.8	1	4.5	7	8.4
Specialist in Education	1	1.6	0	0.0	1	1.2
Total	61	99.9	22	99.9	83	99.9

When asked what type of certification the teacher held besides their vocational teaching certificate, 47 indicated they held no other certificates (Table 5). Of the 31 teachers who indicated they held certification besides their vocational teaching certificate, 2 had instructional supervisor certificates, 7 had principal certification, 4 were certified as counselors and 18 held other additional certifications.

Table 5

Frequency Distribution of Certification Held by Teachers Besides Vocational Teaching Certificate

Certificate	Secondary No.	Secondary %	Post-Secondary No.	Post-Secondary %	Total No.	Total %
No Other	35	60.3	12	60.0	47	60.3
Instructional Supervisor	1	1.7	1	5.0	2	2.6
Principal	6	10.3	1	5.0	7	8.9
Counselor	3	5.2	1	5.0	4	5.1
Other Additional	13	22.4	5	25.0	18	23.1
Total	58	99.9	20	100.0	78	100.0

In a survey of how they would rate their business/industry work experience, 10 indicated it had been minimal, 19 rated it adequate - sufficient for that required for vocational certification, 20 replied they had had more experience than necessary for certification and 32 had extensive work experience - more than four years (Table 6). Three teachers did not respond to the question.

Table 6

Frequency Distribution of Business/Industry Work Experience of Teachers

Amount	Secondary No.	Secondary %	Post-Secondary No.	Post-Secondary %	Total No.	Total %
Minimal	8	13.6	2	9.1	10	12.3
Adequate	15	25.4	4	18.2	19	23.5
More Than Necessary	15	25.4	5	22.7	20	24.7
Extensive	21	35.6	11	50.0	32	39.5
Total	59	100.0	22	100.0	81	100.0

Missing = 3

When asked whether or not they had previously had any special training in classroom interaction strategies, 56 indicated they had not (Table 7). Twenty-seven responded that they had received some type of training in classroom interaction strategies.

Table 7

Frequency Distribution of Special Training in Classroom Interaction Strategies by Teachers

Presence of Training	Secondary No.	Secondary %	Post-Secondary No.	Post-Secondary %	Totals No.	Totals %
No	46	75.4	10	45.5	56	67.5
Yes	15	24.6	12	34.5	27	32.5
Total	61	100.0	22	100.0	83	100.0

Missing = 1

Instrumentation

The thrust of this research was to measure interaction patterns and identify bias or inequity which might occur in the way teachers interact with male and female students. The INTERSECT observation system developed and field tested by Sadker, Bauchner, Sadker, and Hergert (1981) was used for coding purposes. The INTERSECT system was designed for use in recording the distribution and nature of teacher comments to students.

The INTERSECT Observation System is comprised of three sections (Appendix D). Part one includes classroom data such as grade level, subject and gender mix of the classroom. The second section includes 17 categories on which the observers record the type of interaction as it occurs, the sex of the student, and whether the interaction was academic or conduct related. The third section provides an opportunity for the observer to record notes and comments that could provide a more detailed description of the classroom situation at the time of the interaction, including a seating chart.

The INTERSECT system of analyzing classroom interaction results in a number of interaction scores ranging from Praise to Criticism of both the academic performance and the classroom conduct of the students. The following descriptions of the interaction variables were cited by Thomas (1983, pp. 11-12):

> "1. Praise - a teacher's response to student characteristics or behavior that explicitly indicates a positive reaction beyond acceptance. Both the word choice of the teacher's comment and the intonation of the teacher's voice determine a praise comment. Examples would include 'Excellent!' or 'Okay!!'

2. Acceptance - a verbal comment and/or nonverbal expression used by the teacher that implicitly or explicitly indicates the appropriateness or correctness of students' characteristics or behaviors. Examples would include 'right,' 'yes,' or 'okay' stated without strong or enthusiastic intonation.

3. Remediation - teacher response to student characteristics or behavior that implicitly indicates lack of acceptance and/or suggests alternatives. Such a remark may suggest corrective action for student performance or behavior. The comment is not an explicit negative evaluation. Examples would include 'Please sit up straight' or 'State your explanation again.'

4. Criticism - a teacher response to student characteristics or behavior that explicitly indicates negative teacher evaluation and strong disapproval. These are not merely corrective, such as 'Raise your hand,' but explicitly negative as the result of intense, harsh intonation or negative content. Examples would include 'That's a bad job' or 'You will not be allowed to come late to class.'

These four types of interactions were further analyzed as to whether each interaction concerned the student's academic work or conduct as follows:

> Intellectual Content - a teacher's verbal or nonverbal response to the academic content of a student's performance.
>
> Conduct Content - a teacher's verbal or nonverbal response to student classroom deportment."

Thus, each classroom observation could result in eight different interaction types.

Coefficient of Distribution

In that classes were rarely, if ever, a 50-50 mix between males and females, a system had to be devised to adjust for the gender balance of the class. The technique devised to adjust for the uneven distribution of males and females in the classroom was the calculation of a measure called the Coefficient of Distribution. The following example of how this coefficient is derived was taken from a National Institute of

Education research report on classroom interaction by Sadker and Sadker (1984).

To determine the distribution of intellectual criticism between males and females in one classroom, these steps were followed:

1. Count the total number of students in the class, (i.e., 25 students).

2. Count the total number of males present, then the number of females (i.e., 10 males and 15 females).

3. Divide the total number of males by the total number of students; then divide the total number of females by the total number of students. This will yield the expected percentage of interactions for each sex; for example, 10/25 = 40% (expected contact for males), 15/25 = 60% (expected contact for females).

4. Count the total number of contacts for all students in the category being examined; for example, the teacher criticized students 10 times.

5. Count the total number of times teacher criticism was directed at females; then count the total number of times teacher criticism was directed at males; for example, the teacher criticized males five times and females five times.

6. Divide the number of criticisms for males by the total number of contacts for all students; then divide the number of criticisms for females by the total number of contacts for all students. This will yield the actual percentage of interaction for each sex; for example,

5/10 = 50% (actual criticism for males), 5/10 = 50% (actual criticism for females).

7. Compare the results in step 3 (the expected percentage) with the results in step 6 (the actual percentage) by subtraction. The difference between the two is called the coefficient of distribution. If the coefficient of distribution is a positive percentage, that sex is getting more attention than expected. If the coefficient of equity is negative percentage, that sex is receiving less attention than expected.

Example:

50% actual female criticism

-60% expected female criticism

-10% less female criticism than expected given the number of females in the class

50% actual male criticism

-40% expected male criticism

+10% more male criticism than expected given the number of males in the class.

The previous mathematical process enables the researcher to calculate the distribution coefficients for each of the dependent variables.

Observer Training and Reliability

The seven classroom observers who collected data from secondary vocational education classrooms, attended an intensive two-day training session in Washington, D.C. The training was conducted by David and Myra

Sadker, two of the authors and researchers most instrumental in the development and use of the INTERSECT observation system. Observers were sent a 50 page INTERSECT observational manual to study prior to arrival in Washington, D.C. While in Washington, D.C., the Sadkers reviewed the system with the observers who practiced coding utilizing films and videotapes. Following extensive practice in coding, observers were tested out on the instrument until all observers had achieved an interrater reliability of .80 or higher.

The observers for the post-secondary phase of the study included only one new observer who was trained on sight in the observational technique through studying the manual, practice coding using videotapes, practice sessions and discussions with other observers. The four observers from the first year of the study also reviewed tapes and did practice coding until an interrater reliability of .85 was reached.

Data Collection

Secondary Classrooms

During February , March and early April, 1988, visits were completed to the 62 secondary vocational education classrooms selected for participation in the study. Four program areas were selected for participation, including: Business and Office, Agriculture, Home Economics, and an Other category which included secondary courses not fitting into the first three categories.

Post-Secondary Classrooms

From late February to early May 1989, visits were made to the 22 post-secondary vocational education classes at State Vocational/Technical

Schools selected for participation in the study. The post-secondary classes were divided into technical and support/core courses for comparative purposes for this study.

Three visits were made to most classes. However, in a very few instances, three visits weren't completed, (e.g., having driven to Owensboro to observe one class which had been rescheduled due to a teacher's change in class schedule). Or, as in the case with post-secondary classes, the observer arrived as scheduled to find that class had been dismissed to allow students to vote and the instructor was ill and had cancelled class without informing the research staff.

Even with these few exceptions, more classroom observations were made than projected in our plans. The observers followed the INTERSECT procedures to record the classroom interactions as they occurred.

Data Analysis

The data collected for this study were entered on to the University of Kentucky's Mainframe computer for analysis purposes. The statistical package SAS was used to complete all statistical analyses. Descriptive statistics were calculated on the data, plus coefficients of distribution to determine inequities in interactions between male and female students and Chi-square analyses were done to determine if teacher characteristics explained any of the variance in distribution of interactions.

Statistical Analyses

Research hypotheses regarding interaction differences and the influence of teacher characteristics were tested using multivariate and

univariate analysis of variance and one group comparison t-test techniques. Teacher characteristics were gathered from a brief survey. The total number of subjects in some analyses varied due to the failure of some teachers to respond completely to the survey. Certain comparative analyses were limited by small numbers of subjects within some of the categories of teacher characteristics. In these cases, where group number would not permit appropriate comparative analyses, subjects were combined and more descriptive within-group analyses were completed.

Dependent Variables

The four primary types of interaction: praise, remediation, acceptance, criticism, served as the dependent variables for the statistical analyses. Observational frequency data on these four variables were summarized across all observations and then divided by the total number of male and female students in the observed classes. This calculation resulted in the number of interactions per male student and the number of interactions per female student for each of the four interaction types. Analysis of specific interaction content (e.g., praise-conduct, praise-appearance, praise-intellect) further reduced the practical meaningfulness of the results. Therefore, these content categories within each interaction type were combined for purposes of these analyses.

Presentation of Findings

The discussion of results is organized into two sections. First, interaction differences on the basis of student gender, instructional level (secondary or post-secondary), and the vocational program area

of the students were examined. Second the influence of various teacher characteristics (experience, education, etc.) on the equity of teacher interactions with male and female students was investigated.

Findings were also compared with the results of previous studies done in non-vocational elementary/secondary and post-secondary classrooms.

RESULTS

The primary purpose of this study was to investigate the classroom interactions between teacher and student in Kentucky's secondary and postsecondary vocational education classes. The previous sections of this report included an introduction to why this study was important, a review of literature from previous studies related to classroom interaction patterns, and a description of the procedures and measures utilized in the collection and analysis of the data. The findings from the observations of vocational education classrooms in Kentucky follows in two sections: first, an analysis of classroom interactions; and second, an analysis of interaction in relationship to teacher characteristics.

Classroom Interaction Analysis

Eighty-five vocational education classrooms in Kentucky were observed, consisting of 63 secondary and 22 post-secondary. The secondary classrooms were comprised of 14 home economics classes, 9 agriculture, 31 business and 9 other vocational type classes which did not fit the other three categories. The post-secondary classrooms were divided into 13 technical courses related to a specific skill or trade (i.e., drafting, civil and highway technology, and respiratory therapy); and 9 support courses, not directly related to a skill or trade (i.e., family life skills and computer literacy). Most teachers were observed three times, resulting in a total of 245 observations, 182 in secondary and 63 in post-secondary settings.

Total Interactions

For the purpose of this study, an interaction was defined as any verbal or nonverbal exchange in which a teacher responded to a student. The exchange could have been initiated by the teacher or by the student. Presented in Table 8 is a breakdown of the total number of interactions observed by type of interaction. While Table 8 contains no analysis other than frequencies and percentages, it very vividly displays how teachers interact with their students. For academic-related interactions, only three percent were praise and two percent criticism. The remaining 95 percent centered around what the Sadkers (1986) have described as a "flat, bland and unexciting" classroom. Concerning conduct-related interactions, a different pattern emerged; however, again note Praise, where only three of 579 interactions occurred. There were also very few acceptance interactions, 9.7 percent. Nearly 90 percent of the conduct-related interactions were for Remediation (52.2%) or Criticism (37.7%).

Overall, our teachers provided little praise to their students. They also provided little criticism, except for the small number of conduct criticisms.

Table 8

Summary of Total Interactions by Interaction Type and by Secondary and Post-secondary Vocational Classrooms

Interaction Type	Classroom Setting: Secondary No.	Secondary %	Post-Secondary No.	Post-Secondary %	Total No.	Total %
Academics						
Praise	276	2.9	104	4.0	380	3.1
Acceptance	5973	61.8	1512	58.8	7485	61.2
Remediation	3204	33.1	931	36.2	4135	33.8
Criticism	214	2.2	26	1.0	240	2.0
Total	9667	100.0	2573	100.0	12,240	100.1
Conduct						
Praise	2	0.4	1	3.0	3	0.5
Acceptance	54	9.9	2	6.1	56	9.7
Remediation	280	51.3	22	66.7	302	52.2
Criticism	210	38.5	8	24.2	218	37.7
Total	546	100.1	33	100.0	579	100.1

The following tables and discussion provide an analysis of the interaction by grade level, vocational program, and by type of interaction.

All classrooms observed contained some type of teacher-student interaction. The secondary classrooms had an average of 60 interactions, while an average of 43 interactions was observed in post-secondary classrooms, regardless of the type of interaction (Table 9).

The tables reporting the various types of interactions are presented using the same format to display the interaction data. An explanation of their format is as follows: Column 1 - vocational Education Area displays the type of school (secondary, post-secondary) and

the program area (home economics, agriculture, business, other vocational type, technical and support) to which the statistics in the respective rows correspond.

The number of classrooms in which the interaction occurred is shown in column 2 - Classroom Observations. The percentage reflects the percentage of possible classroom observations the number represents. Column 3 - Mean Number of Interactions - depicts the average frequency of respective interaction across all observations.

The last heading, Coefficient of Distribution, exhibits the distribution of interactions among students by gender (column 4 represents males; females are represented in column 5) in relationship to the expected distribution based on their representation in the classroom population. A negative value in these last two columns indicates that the students received less interaction than expected, while a positive value indicates more interaction for that gender group than expected. A zero value implies that males and females were receiving an equal percentage of interactions as determined by their representation in the classroom population.

At the secondary level, regardless of program area, teacher interaction with males was greater than would be expected based on their representation in the classroom. Males received over six percent more interaction than expected and females over six percent less. The inequities were the most severe in home economics (+7.4%) and business (+7.1%); this translates to males receiving an average of close to four

Table 9

Descriptive Statistics of Total Teacher-Student Interactions in Secondary and Post-Secondary Vocational Education Classrooms

Vocational Education Area	Classroom Observations No.	Classroom Observations %	Mean Number Interactions	Coefficient of Distribution Males %	Coefficient of Distribution Females %
Secondary					
Home Ec.	40	22.0	55	7.4	-7.4
Agriculture	26	14.3	64	2.6	-2.6
Business	91	50.0	63	7.1	-7.1
Other	25	13.7	55	5.5	-5.5
Total	182	100.0	60	6.3	-6.3
Post-Secondary					
Technical	39	61.9	41	-0.6	0.6
Support	24	38.1	46	6.8	-6.8
Total	63	100.0	43	2.3	-2.3

interactions more than expected and the females four less interactions. Given mean numbers of interactions of 55 in home economics and 63 in business, this is a substantial inequity. Other vocational type courses had an inequity of +5 percent, while agriculture classrooms had the least inequity of all the program areas with a +two percent Coefficient of Distribution which indicated that males were getting only one interaction more than expected and females one interaction less than expected.

At the post-secondary level, males also received more interactions than expected and females less; however, the distribution was closer to equity at +two percent (Table 9). Inequity in interactions was severe in post-secondary support type courses (+6.8%), where males received an average of better than three more interactions than expected and females received three less interactions. The distribution of interactions in technical classes was very near equity (+0.6%).

Praise of Student Intellect

Intellectual praise were those classroom interactions in which the teacher offered positive reinforcement of a student's idea, comment or other academic performance. Praise was defined to include verbal content and intonation.

In 83 of the secondary classroom observations (45.6%), teachers praised their students academic performance (Table 10). However, the mean number of praise interactions was only three per class session. Of the secondary classes observed, 54.4 percent did not have a single incident of praise. In 24 of the post-secondary classroom observations (38.1%), teachers praised their students academic performance (Table 10). However, the mean number of praise interactions was only four. Of the post-secondary classes observed, 61.9 percent did not have a single incident of praise.

Since intellectual praise was not a common secondary or post-secondary classroom interaction, the size of the coefficient of distribution for males and females was deceptive. Given a low mean number of three intellectual praise interactions, even a disparity of +20.7% reflects less than one interaction difference from equity. Therefore, the differences of +8.7 percent, +6.8 percent and +20.7 percent in the distribution between female and male students does not result in a great difference in the actual number of frequency of such interactions.

Table 10

Descriptive Statistics of Teacher Praise of Student Intellectual Response and Work in Secondary and Post-Secondary Vocational Education Classrooms

Vocational Education Area	Classroom Observations No.	%	Mean Number Interactions	Coefficient of Distribution Males %	Females %
Secondary					
Home Ec.	14	35.0	2	8.7	-8.7
Agriculture	14	53.8	3	20.7	-20.7
Business	41	45.1	4	3.1	-3.1
Other	14	56.0	3	2.2	-2.2
Total	83	45.6	3	6.8	-6.8
Post-Secondary					
Technical	16	41.0	5	5.0	-5.0
Support	8	33.3	3	20.5	-20.5
Total	24	38.1	4	7.2	-7.2

Acceptance of Student Intellect

Intellectual acceptance are those classroom interactions in which the teacher accepted a student's intellectual comment as correct or appropriate. If a teacher did not acknowledge a student's intellectual response, but proceeded with additional comments or questions that implied accuracy of the student's response, these remarks were also recorded as acceptance.

Acceptance of student intellectual responses and work was found in almost all secondary (99.5%) and post-secondary (96.8%) vocational education classrooms (Table 11). The average number of acceptance of student intellectual work in the secondary classrooms was 33 and 24 in

post-secondary classes. Regardless of school type or program area, females received less interactions than expected and males received more interactions than expected based on their representation in the classrooms.

Table 11

Descriptive Statistics of Teacher Acceptance of Student Intellectual Response and Work in Secondary and Post-Secondary Vocational Education Classrooms

Vocational Education Area	Classroom Observations No.	Classroom Observations %	Mean Number Interactions	Coefficient of Distribution Males %	Coefficient of Distribution Females %
Secondary					
Home Ec.	40	100.0	28	4.0	-4.0
Agriculture	26	100.0	37	4.3	-4.3
Business	90	98.9	34	6.9	-6.9
Other	25	100.0	31	9.1	-9.1
Total	181	99.5	33	6.2	-6.2
Post-Secondary					
Technical	37	94.9	24	7.2	-7.2
Support	24	100.0	26	6.7	-6.7
Total	61	96.8	24	7.0	-7.0

At the secondary level for all areas, the inequity was +6.2 percent, indicating that males received more interactions than females. The greatest inequities appeared in business (+6.9%) and other vocational type courses (+9.1%).

In post-secondary the inequity increased only slightly to +7.0 percent, also in favor of the males. Technical courses had a coefficient

of +7.2 percent and support courses had only a slightly lower percentage of +6.7, both coefficients indicated more interactions with males and less interactions with females than expected based on their representation in the class.

Remediation of Student Intellect

Remediation of student intellect consisted of those classroom interactions in which the teacher did not accept the accuracy of level of the quality of the student's intellectual response or work. These remarks were not harshly or sarcastically stated. If the teacher did not respond to a student's intellectual response, but continued with comments or questions that indicated that the students response was not accurate, it was recorded as intellectual remediation. Remediation should not be considered a negative interaction, it can be both positive and constructive.,

Remediation of student intellect was found in almost all secondary (97.8%) and post-secondary (96.8%) vocational education classrooms (Table 12). The average number of remediations of student intellectual work in the secondary classrooms was 18 and 15 in post-secondary classes. Regardless of school type, females received less interactions than expected and males received more interactions than expected based on their representation in the classrooms. However, in post-secondary technical courses, females received more interactions than would have been expected and males received less. In all other program areas male

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students received more intellectual remediation than expected and females less than expected.

Table 12

Descriptive Statistics of Teacher Remediation of Student Intellectual Response and Work in Secondary and Post-Secondary Vocational Education Classrooms

Vocational Education Area	Classroom Observations No.	Classroom Observations %	Mean Number Interactions	Coefficient of Distribution Males %	Coefficient of Distribution Females %
Secondary					
Home Ec.	39	97.5	16	5.4	-5 4
Agriculture	26	100.0	15	4.0	-4.0
Business	89	97.8	20	6.5	-6.5
Other	24	96.0	16	3.4	-3.4
Total	178	97.8	18	5.5	-5.5
Post-Secondary					
Technical	38	97.4	13	-3.2	3.2
Support	23	95.8	19	7.5	-7.5
Total	61	96.8	15	0.8	-0.8

Criticism of Student Intellect

Teacher criticism of student intellectual response or work were those classroom interactions in which the teacher offered strong or explicit disapproval of a student's idea, response, or academic performance. Teacher remediation clearly indicated negative teacher evaluation. Intellectual criticism includes both verbal content and intonation.

Teacher criticism of student intellectual content was used far less frequently than other teacher reactions to student academic performance. Criticism of student intellect occurred in less than 39 percent of the secondary classrooms and only 20.6 percent of the post-secondary classrooms (Table 13). Males appeared to receive more criticism of intellect interactions and females less in all areas except post-secondary technical where the reverse was true.

Table 13

Descriptive Statistics of Teacher Criticism of Student Intellectual Response and Work in Secondary and Post-Secondary Vocational Education Classrooms

Vocational Education Area	Classroom Observations No.	Classroom Observations %	Mean Number Interactions	Coefficient of Distribution Males %	Coefficient of Distribution Females %
Secondary					
Home Ec.	16	40.0	2	4.2	-4.2
Agriculture	11	42.3	2	11.0	-11.0
Business	37	40.7	4	16.0	-16.0
Other	6	24.0	2	17.7	-17.7
Total	70	38.5	3	12.6	-12.6
Post-Secondary					
Technical	6	15.4	2	-5.6	5.6
Support	7	29.2	2	8.4	-8.4
Total	13	20.6	2	1.9	-1.9

However, like in praise of intellectual work, since intellectual criticism was not a common classroom interaction, the size of the coefficient of distribution for males and females was deceptive. Given a low mean number of two intellectual criticism interactions, even a

disparity of +17.7 percent reflected less than one interaction difference from equity. Therefore, the differences of +11.0 percent, +16.0 percent and +8.4 percent in the distribution between female and male students does not result in a great difference in the actual number or frequency of such interactions. The low means of criticism interactions makes the coefficients of distribution unreliable.

Praise of Student Conduct

Conduct is student behavior which does or does not conform to classroom norms or rules for appropriate conduct. Praise of conduct therefore, is the teacher's explicit approval, by content or intonation of student actions and/or performance.

Teacher praise of student conduct was practically non-existent in vocational education classrooms; it occurred in only 1.1 percent of the secondary classrooms observed and 1.6 percent of the post-secondary classrooms (Table 14). Ninety-nine percent of the vocational classrooms observed in Kentucky did not have a single incident of praise. Further, the praise incidents recorded in the post-secondary support classroom were recorded during a test review session. Due to the paucity of interactions, the analysis must be viewed with extreme caution.

Table 14

Descriptive Statistics of Teacher Praise of Student Conduct in Secondary and Post-Secondary Vocational Education Classrooms

Vocational Education Area	Classroom Observations No.	Classroom Observations %	Mean Number Interactions	Coefficient of Distribution Males %	Coefficient of Distribution Females %
Secondary					
Home Ec.	1	2.5	1	-41.7	41.7
Agriculture	0	0.0	-	-	-
Business	1	1.1	1	43.5	-43.5
Other	0	0.0	-	-	-
Total	2	1.1	1	.9	-.9
Post-Secondary					
Technical	0	0.0	-	-	-
Support	1	4.2	1	60.8	-60.8
Total	1	1.6	1	60.8	-60.8

As was the case in praise and criticism of intellectual work, the size of the Coefficient of Distribution for males and females is deceptive. Given a low frequency and mean of only one conduct praise interaction, even a disparity of +43.5 percent reflected less than one interaction difference from equity. Therefore, the low frequency of praise of conduct interactions makes the coefficients of distribution unreliable. The data on conduct interactions were presented for descriptive purposes to show just how few conduct interactions occur in vocational education classrooms.

Acceptance of Conduct

Acceptance of conduct was a teacher's comment that implied correctness or appropriateness of a student's conduct or behavior. There

were very few acceptance responses to student conduct; acceptance of conduct was found in only 14.8% of the secondary classrooms and 3.2% of the post-secondary vocational education classrooms (Table 15). The numbers were again too small which makes the Coefficients of Distribution unreliable and does not allow for accurate analysis.

Table 15

Descriptive Statistics of Teacher Acceptance of Student Conduct in Secondary and Post-Secondary Vocational Education Classes

Vocational Education Area	Classroom Observations No.	Classroom Observations %	Mean Number Interactions	Coefficient of Distribution Males %	Coefficient of Distribution Females %
Secondary					
Home Ec.	9	22.5	1	25.1	-25.1
Agriculture	0	0.0	-	-	-
Business	13	14.3	2	-4.9	4.9
Other	5	20.0	3	-27.8	27.8
Total	27	14.8	2	.9	-.9
Post-Secondary					
Technical	1	2.6	1	-25.0	25.0
Support	1	4.2	1	-28.6	28.6
Total	2	3.2	1	-26.8	26.8

Remediation and Criticism of Conduct

Very few teacher remediations or criticisms of student conduct were observed in the vocational education classrooms in this study. At the secondary level, remediation of student conduct occurred in 38.5 percent of the classrooms (Table 16) and criticism of the same also occurred in

38.5 percent of the classrooms (Table 17). The Coefficient of Distribution for remediation was +14.6 percent and + 17.3 percent for criticism, both indicating that males received more interactions than expected for conduct and females receiving less interactions than expected. This was true for all program areas and both categories of conduct interactions except in agriculture, where females received more criticism of conduct interactions and males received fewer than expected.

Table 16

Descriptive Statistics of Teacher Remediation of Student Conduct in Secondary and Post-Secondary Vocational Education Classrooms

Vocational Education Area	Classroom Observations No.	Classroom Observations %	Mean Number Interactions	Coefficient of Distribution Males %	Coefficient of Distribution Females %
Secondary					
Home Ec.	18	45.0	3	13.8	-13.8
Agriculture	9	34.6	2	20.1	-20.1
Business	33	36.3	3	17.5	-17.5
Other	10	40.0	5	1.2	-1.2
Total	70	38.5	4	14.6	-14.6
Post-Secondary					
Technical	4	10.3	2	1.2	-1.2
Support	7	29.2	2	19.9	-19.9
Total	11	17.5	2	13.0	-13.0

At the post-secondary level, remediations of student conduct occurred in 17.5 percent of the classrooms (Table 16) and criticisms of the same occurred in 6.3 percent of the classrooms (Table 17). The Coefficient of Distribution for remediation were +13.0 percent and +48.4

percent for criticism. The remediation Coefficients of Distribution indicated that males received more remediations for conduct interactions than expected and females received less interactions than expected. While the opposite was true for criticism of conduct, females received more interactions than expected and males received fewer interactions.

Table 17

Descriptive Statistics of Teacher Criticism of Student Conduct in Secondary and Post-Secondary Vocational Education Classrooms

Vocational Education Area	Classroom Observations No.	Classroom Observations %	Mean Number Interactions	Coefficient of Distribution Males %	Coefficient of Distribution Females %
Secondary					
Home Ec.	14	35.0	2	38.7	-38.7
Agriculture	11	42.3	3	-21.7	21.7
Business	37	40.7	3	21.7	-21.7
Other	8	32.0	2	12.8	-12.8
Total	70	38.5	3	17.3	-17.3
Post-Secondary					
Technical	2	5.1	2	-39.7	39.7
Support	2	8.3	2	-57.0	57.0
Total	4	6.3	2	-48.4	48.4

Caution must once again be exercised in utilizing the Coefficients of Distribution for remediation and criticism of conduct interactions; the number of actual interactions and mean numbers of interactions were so few that they rendered the coefficients unreliable; they were presented for descriptive purposes only.

Interaction Anaylsis by Teacher Characteristics

Presented in the following section is a narrative description of interaction analysis by teacher characteristics. These analyses were conducted to investigate Research Question Seven, "Are teacher characteristics such as level taught, gender, years of teaching experience, education level, certification, business/industry work experience, or previous training in classroom interaction strategies related to interaction differences between male and female students in secondary and/or post-secondary vocational classrooms?"

The specific question relating to the various teacher characteristics will each be presented, followed by a narrative description of the research findings. In that the tables which present the data are numerous and repetitious, they are grouped in Appendix E rather than presented in the body of the report.

Interaction Differences By Instructional Level:

1. Did teachers at the secondary level interact differently than teachers at the post-secondary level?

A series of one-way analysis of variance was conducted to test for differences between secondary and post-secondary teachers on each interaction variable. Results indicated significant differences on all four variables (refer to Appendix E, Table 18). As a group, post-secondary teachers demonstrated significantly more praise, remediation, and acceptance per female student and significantly less criticism per male student than demonstrated by secondary teachers.

However, their overall percentages of interactions were still in favor of male students, but secondary teachers interacted more often.

More specifically, post-secondary teachers interacted with male students with five times less the criticism than did secondary teachers. Post-secondary teachers praised female students at five times the rate of secondary teachers and gave acceptance and remediation at twice the rate per student than that of secondary teachers. Rates of praise, remediation, and acceptance per male student and criticism per female student were similar between secondary and post-secondary teachers.

While these differences were significant, it should be noted that the two comparison groups were considerably unequal in numbers and this could account for the mean group differences, even though statistical procedures attempted to account for unequal groups.

2. Did secondary and post-secondary teachers interact equitably with male and female students?

Equitability of interactions was investigated by conducting a series of t-tests to determine the probability that the mean difference between interactions per male student and interactions per female student was significant for each dependent variable (results are included in Appendix E, Table 19). The mean differences were calculated by subtracting the mean interaction per female student from the mean interaction per male student. If this difference score was significant, then the interaction between male and female students was considered to be inequitable. Negative means indicated that interactions per female student were greater than interactions per male student.

Generally, secondary teachers' interactions were not equitable in their interactions. Interactions per male student occurred significantly more than interactions per female student on all four interaction variables. In contrast, post-secondary teachers' interactions were more equitable. However, they tended to interact more per female student than per male student though these differences were slight and were not large enough to reach statistical significance. Post-secondary teachers did interact more with male students than female students when interactions involved criticism.

3. Did secondary and post-secondary male teachers interact differently than female teachers?

A series of analysis of variance was conducted to determine the presence of interaction differences between the secondary male and secondary female teachers with respect to the four dependent variables: praise, remediation, acceptance and criticism (Appendix E, Table 20). A similar analysis was completed to compare male teachers with female teachers at the post-secondary level (Appendix E, Table 21). Results indicated no significant differences between male and female teachers at either level of instruction on any of the interaction variables with male and female students.

4. Were male and female teachers' interactions equitable between male and female students at the secondary and post-secondary levels?

The results of multiple t-test comparisons revealed that at the secondary level, female teachers interacted significantly more often per

male student than per female student on all variables. However, male teachers at the secondary level were observed to interact equitably with only one exception: male teachers' rate of criticism per male student was significantly higher than their criticism per female student (Appendix E, Table 22).

Equitable teacher interaction levels with male and female students were observed at the post-secondary level (Appendix E, Table 23). There were no significant differences between the way female teachers at the post-secondary level interacted with male and female students on all variables. Similarly, no significant differences were found in the way male teachers at the post-secondary level interacted with male and female students.

Teacher Gender:

5. Did male teachers interact differently than female teachers?

In order to further explore the possibility of gender differences and to overcome the limitation of small unequal comparison groups, secondary and post-secondary teachers were combined and sorted by gender. This resulted in two comparison groups: all male teachers (n=36) and all female teachers (n=48). Results from analysis of variance on all variables indicated that male teachers' interactions per male and female students were not significantly different than female teachers' interactions per male and female students (Appendix E, Table 24).

6. Did male and female teachers interact equitably with male and female students?

The equity of teacher interactions with male and female students was examined on the basis of teacher gender without regard to instructional level. Results overall showed that both male teacher and female teachers interacted equitably with students with regard to praise, remediation, and acceptance per male student as per female student. However, both male and female teachers' interactions were not equitable when it came to criticism. Both male and female teachers gave significantly more criticism per male student than per female student (Appendix E, Table 25).

Where teacher characteristics could be appropriately divided and grouped for comparisons, differences between groups were tested with multivariate analysis of variance techniques. However, because of the unequal distributions of teacher responses for several of the teacher characteristics surveyed, between group comparisons were not always feasible. However, the influence of all teacher characteristics on the equity of teacher interactions with male and female students was investigated. The differences between the ratio of teacher interaction per male student and the ratio of teacher interaction per female student were calculated and were used as the four dependent variables to conduct one-sample t-test comparisons to determine interaction equity.

Teaching Experience:

7. Did teachers with varying amounts of teaching experience interact differently with male and female students?

Teachers were divided into three groups on the basis of three levels of experience: low, moderate and high experience levels (Appendix E, Table 26). These three experience groups were compared on each interaction variable per male student and per female student resulting in 8 separate analysis of variance tests. Results indicated no significant differences in interactions per female student and per male student on any of the dependent variables (Appendix E, Table 27).

8. Did teachers with varying amounts of teaching experience interact equitably with male students than they did with female students?

Interactions on the praise, remediation, and acceptance variables appeared equitably distributed between male and female students for all three teaching experience groups (Appendix E, Table 28).

Level of Education:

9. Did teachers with varying amounts of teacher education interact differently with male and female students?

Teachers were grouped into three levels of education: Level 1 (an Industrial Teaching Certificate, or a Bachelors degree, or a Bachelors degree plus additional credits, or Rank 3); Level 2 (Masters degree or Masters degree plus additional credits, or Rank 2); Level 3 (Rank 1, Rank 1 plus additional credits, or a Specialist degree).

Multivariate analysis of variance on all dependent variables showed no significant differences between teachers with varying degrees of

education (Wilks' Lambda = 0.86, $F(16, 146) = 0.68$, prob. $F = 0.81$). Means and standard deviations on each variable for male and female students for each of the three teacher education level groups are included in Appendix E, Table 29.

10. Did teachers with varying amounts of teacher education interact equitably with male students and with female students?

Level of teacher education appeared to be unrelated to equity of teacher interactions with the exception of criticism. An analysis of interaction equity showed that significantly more criticism per male student than per female student was evidenced by teachers regardless of their level of professional education (Appendix E, Table 30).

Teacher Certification:

11. Did teachers with additional certification interact with male and female students differently than teachers with no additional certification?

Teachers were sorted into three groups according to their level of certification: Group 1 (no additional certificate); Group 2 (teachers holding an instructional supervisor, principal or counselor certificate); and Group 3 (teachers holding other additional types of certification). A multivariate analysis of variance method was employed to test for the presence of significant differences between the three certification groups on all interaction variables with male and female students (Appendix E, Table 31). Results indicated no significant differences in how teachers with varying types of educational certification

interacted with male and female students (Wilks' Criterion Lambda = 0.69, F = (24, 122) = 1.01, Prob F = 0.45).

12. Did teachers with varying levels of certification interact equitable with male students than they did with female students?

The equity of teacher interaction on the basis of the three certification groups was also examined (Appendix E, Table 32). Teachers in Group 1, with no additional certification beyond their teaching credential, demonstrated significantly more acceptance and criticism per male student than per female student. Teachers in Group 2 (an instructional supervisor, principal or counselor certificate) demonstrated significantly more criticism per male student than per female student. While teachers in Group 3 (other additional types of certification) were observed to interact with more criticism per male student than per female student, this difference failed to reach statistical significance.

Work Experience:

13. Did teachers with varying amounts of work experience interact differently with male and female students?

Teachers were classified into four groups on the basis of their reported work experience: minimal, adequate for certification, more than necessary for certification, or extensive (4 or more years). A multivariate analysis of variance method was employed to test for the presence of significant differences between the four work experience groups on all interaction variables with male and female students

(Appendix E, Table 33). Results indicated no significant differences in how teachers with varying amounts of work experience interacted with male and female students (Wilks' Criterion Lambda = 0.76, F = (24, 197.82) = 0.81, Prob F = 0.72).

14. Did teachers with varying amounts of previous experience interact equitably with male and female students?

Those with the least amount of business/industry work experience interacted equitably with male and female students. Teachers having adequate work experience for certification, more work experience than necessary for certification, and an extensive amount of work experience demonstrated equitable praise, remediation, and acceptance interactions per male student and per female student. However, similar to findings on other characteristics , teachers with more experience were observed to engage in significantly more criticism per male student than female student (Appendix E, Table 34).

Classroom Interaction Training:

15. Did teachers with some previous training in classroom interaction strategies interact with male and female students differently than teachers who had not received interaction training?

Teachers indicating they had participated in interaction training were compared to teachers without interaction training with analysis of variance on all interaction variables. Results showed significant differences. Teachers with interaction training had two times the rate of acceptance per female student, two times the rate of remediation per

female student, and nearly five times the rate of praise per female student than did teachers without interaction training (Appendix E, Table 35).

16. Did teachers with interaction training interact equitably with male and female students?

A series of t-tests was conducted to examine the equity of interaction between male and female students for teachers with and without interaction training. Results showed that teachers with training interacted equitably with male and female students on the praise, remediation and acceptance variables. Criticism per male student was more frequent than criticism per female student for trained teachers. Teachers without interaction training were found to have higher interactions per male student than per female student on all four variable: praise, remediation, acceptance and criticism (Appendix E, Table 36).

17. Did teachers with interaction training interact equitably with male and female students at the secondary and post-secondary level?

Results from a series of t-tests indicated that trained teachers demonstrated equitable interactions between male and female student interactions at both the secondary and the post-secondary levels. Teachers without training interacted equitably with male and female students at the post-secondary level only. And, at the secondary level, teachers without training tended to demonstrate more praise, remediation, acceptance and criticism per male student than per female student (Appendix E, Table 37).

Vocational Area:

18. Did teachers in various vocational education areas interact with students differently?

On the basis of the vocational education area in which they taught, teachers were grouped within one of three secondary vocational education areas: Home Economics, Agriculture, Business, or within one of the two post-secondary vocational education areas: Technical courses Support courses. A multivariate analysis of variance was employed to test for the presence of significant differences between the six vocational education areas on all interaction variables with male and female students (Appendix E, Table 38). Results indicated no significant differences in how teachers from the various vocational education areas interacted with male and female students (Wilks' Criterion Lambda = 0.58, F = (40, 273.05) = 0.90, Prob F = 0.63).

19. Did teachers in different vocational education areas interact equitably with male and female students?

Using multiple t-tests, differences between interactions per male student and interactions per female student were analyzed within each of the six vocational education areas outlined previously. In the vocational areas of Home Economics and Business, the only significant difference was found on the criticism variable, with more criticism per male student than female student. In the remaining vocational areas interactions appeared equitably distributed on all variables, with no

significant differences found (Appendix E, Table 39). The other area was omitted from these analyses.

It must again be stated, however, that since the Praise and Criticism interactions were so few, extreme caution must be taken when drawing conclusions relative to these two dependent variables.

SUMMARY

The results of previous research designed to investigate classroom interaction patterns have consistently pointed up the fact that males received a disproportionate amount of attention from the teacher. However, no data were available which described interactions in Vocational Education classes. The purpose of this research was to identify the pattern of interactions in a sample of vocational classes in Kentucky's secondary and post-secondary schools and compare these findings to other studies to ascertain whether or not these classes displayed the sex bias observed in previous research. This summary will center mainly on interactions dealing with academic work; there were too few conduct interactions to allow reliable interpretation.

From the Office of Vocational Education and teacher preparation point of view, the desired results would reveal no sex bias, i.e., there would be a proportionate number of interactions for either sex. Unfortunately, this was not the case. The results of this study were consistent with previous research at the secondary and post-secondary levels. A larger proportion of interactions was consistently directed toward males. Thus, differences do exist in the interaction levels between secondary and post-secondary vocational education teachers and the male and female students in their classrooms.

Another finding which was disturbingly similar to previous research was that the teachers gave very little praise to their students. Most did, however, reach a high level of Acceptance interactions, particularly

with regard to the students' academic work. However, these interactions are of the type which contribute to a "bland" classroom (Sadker and Sadker, 1986). On a more positive note, criticism occurred even less frequently than praise.

When the categories of interaction were investigated for inequities between gender groups, it was found that differences existed in all types of interactions. At the secondary level, females received less praise, but they also received less criticism. The least amount of inequity between gender at the secondary level was found for remediation. At the post-secondary level, equity or near equity was found for teacher remediation and criticism for student intellectual response and work. Teacher acceptance of student intellectual response and work was directed more often at males and less often at females than would have been expected given their representation in the classroom. Additionally, and in line with previous research, nearly one-third fewer interactions occurred at the post-secondary level.

When looking at differences in interaction patterns by gender and program area, one must exercise caution when viewing comparisons in which few interactions occurred. A major inequity appeared to have occurred in Agriculture with 20.7 percent more male praise of intellectual work interactions; however, the mean number of interactions was only three. Acceptance of intellect was most prevalent regardless of program area or gender of student. The least amount of variation by secondary program area occurred in remediation of intellectual responses and work.

Overall, the post-secondary classrooms appeared to have approached greater equity than the secondary classes; however, this was due to the technical classes. Females in technical classrooms received more interactions and male students received less interaction; therefore, teachers in post-secondary technical courses reached equity of distribution of teacher-student interactions with a Coefficient of Distribution of +0.6 percent. The support-type post-secondary classrooms were as inequitable as the secondary classes.

The gender of the teacher did not appear to have any affect on the teachers' types of interactions with respect to the four dependent variables of praise, remediation, acceptance or criticism. This observation held true at both the secondary and post secondary levels. However, at the secondary level, female teachers were found to interact even more often with male students than did the male teachers. Male and female teachers at the post-secondary level were more equitable in their interactions with male and female students.

When teacher characteristics were explored, results indicated that the amount of teaching experience, level of education, types of teacher certification held, amount of business/industry work experience, and type of vocational class taught, made no significant difference in how teachers interacted with male and female students at both levels. However, it was observed, that regardless of the amount of teaching experience, all teachers were observed to criticize male students more frequently than female students.

The only teacher characteristic studied which displayed a relationship between teacher-student interaction patterns was whether or not the teacher had some previous training in classroom interaction strategies. Overall, teachers with training interacted equitably with male and female students on praise, remediation and acceptance, while criticism was more frequent for male than female students. Teachers without training had more interactions per male students than female students on all types of interactions at the secondary level, while untrained teachers at the post-secondary level, while untrained teachers at the post-secondary level interacted equitably with both males and females.

All-in-all, one must conclude that secondary and post-secondary vocational education teachers in Kentucky displayed behaviors similar to elementary, secondary, and post-secondary academic teachers from other studies. They praised and criticized intellectual ability very little; they accepted and remediated intellectual ability a great deal; and most of their interaction behaviors were directed toward male students. Criticism tended to be directed more at males than at females at all levels; however, significantly more criticism was present at the secondary level.

With interactions directed primarily at male students, "interaction-rich" and "interaction-poor" students are present in Kentucky's vocational education classrooms. Post-secondary vocational education technical teachers came closest to equity in their distribution

of intellectual interactions than any other group of instructors. Vocational education teachers rarely reacted to classroom conduct situations; so little was observed that analysis was not possible.

One significant finding was that the presence of previous training in classroom interaction strategies appeared to be more effective at providing more equitable classrooms at the secondary level. Therefore, it is recommended that education personnel responsible for inservice training for teachers consider courses and seminars on classroom interaction strategies. In such light, those educators who are responsible for development of teacher training programs in Kentucky's colleges and universities should require courses or modules to be completed in interaction strategies in an effort to make vocational education classrooms in Kentucky more equitable learning centers.

These findings can also be beneficial to vocational administrators and supervisors across the state as they work to create more equitable classrooms and promote positive and equal environments for learning for all students.

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APPENDIX A

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November 11, 1987

Mr.
Superintendent
Board of Education

KY

Dear Mr.

The Kentucky Department of Education, through a grant to the University of Kentucky, is sponsoring a rather ambitious research project this school year designed to assess the teacher-student interaction patterns in Vocational Education classrooms. Your district was randomly selected for participation in this study. I hope you will agree to participate; we will be calling you within the next week or two to verify your decision and to answer any questions you might have relative to what would be involved in the project.

Basically, this will be a descriptive study which will involve three one-period observations of selected classrooms. There will be no manipulation of instruction, no evaluation of your teachers, and no classroom participation by the observer. The people who have been trained to observe will simply sit in on the class and record interaction patterns of students and teachers. There is no "good" score or "bad" score. We only wish to establish some baseline data from 19 other schools. Individual classroom data will be anonymous; the data from the 20 participating schools will be analyzed together.

Similar research has been conducted in elementary/secondary schools and in higher education. But, no such data exist for vocational programs.

I hope you agree to work with us on this most important project. Be assured, we will keep any interruptions to a minimum, including pre-scheduling all classroom observations. We would only need your school's cooperation in identifying classrooms with a mix of male and female students, the sex of the teacher, and help in scheduling the visits to your school.

Thank you for your consideration of our request. Dr. Clayton Omvig, Chairman, Department of Vocational Education, University of Kentucky, will be contacting you in the near future.

Sincerely,

Ann S. Bardwell, Ph.D.
Associate Superintendent
Office of Vocational Education

ABS/pgs

UNIVERSITY OF KENTUCKY
LEXINGTON, KENTUCKY 40506-0017

COLLEGE OF EDUCATION
VOCATIONAL EDUCATION
43 DICKEY HALL

February 2, 1988

Principal

Dear Mr.

Enclosed please find a list of the classrooms which have been selected to participate in the Classroom Interaction Project. Also enclosed is a letter to each participating teacher.

We are pleased that your school is among those schools working with us. Be assured, we will make every effort to keep any disturbance or extra work to a minimum. I hope that the biggest problem any of us will face will be arranging for the first visit.

As indicated in my letter to the teachers and in Dr. Bardwell's letter to your superintendent, we merely wish to establish a data base relative to the operation of co-educational classes in vocational education. An individual trained in classroom observation techniques will arrange to visit each teacher's class on three occasions between now and mid-April. Student/teacher interactions will be recorded only. There will be no evaluation of any kind and there is no preconceived notion of how teachers and students should or should not react in a co-ed setting. This will be strictly a descriptive data gathering effort. Data from about 60 classes from across the state will be combined for analysis. No individual teacher/classroom data will be identifiable.

To cut down on travel expenses and time, we hope to visit several classes in your school during each visit. We realize that the scheduling will cause some problems. We are open to any suggestions on how best to accomplish this. Also, how ever you want us to proceed is how it will be done in your school.

We sincerely thank you for your help. Copies of the research report will be made available to cooperating schools by the State Office of Vocational Education.

If you have any questions, please call (606-257-5997).

Sincerely,

Clayton P. Omvig, Chairman
Deprtment of Vocational Education

acm/

PARTICIPATING TEACHERS

CLASSROOM INTERACTION PROJECT

_____
(School)

Time/Period		Teacher	Course Title
___ - ___	1	_____	_____
___ - ___	2	_____	_____
___ - ___	3	_____	_____
___ - ___	4	_____	_____
___ - ___	5	_____	_____
___ - ___	6	_____	_____
___ - ___	7	_____	_____

Classroom Interaction Project
Department of Vocational Education
51 Dickey Hall
University of Kentucky
Lexington, Kentucky 40506-0017

UNIVERSITY OF KENTUCKY
LEXINGTON, KENTUCKY 40506-0017

COLLEGE OF EDUCATION
VOCATIONAL EDUCATION
43 DICKEY HALL

February 2, 1988

Teacher

Dear Mr.

As I'm sure you are aware from conversation with school officials and your completing the form identifying classes taught and the male/female mix of those classes, your school (and more specifically, one of your classes) has been selected to participate in a Kentucky Office of Vocational Education sponsored research project. This project is designed to provide a data base relative to the operation of co-educational classes in Vocational Education.

Having both boys and girls represented in the same classes is not new to Vocational Education but the frequency of mixed classes is much greater now than in the past. All we wish to do for this project is to visit one of your co-educational classes three times between now and mid-April. An individual trained in classroom observation techniques will merely arrange for and visit your class and those of selected colleagues. His/her observation will consist of recording student and teacher interactions during the class period. There will be no evaluations of any kind and there is no preconceived notion of how teachers and students should or should not react in a co-ed setting. This will be strictly a descriptive data gathering effort. Data from your class will be combined with data from about 60 other classes for analysis. No individual teacher/classroom will be identifiable.

We hope that this will be a relatively painless effort for you, but it will be a logistical nightmare for us in arranging for the many visits, in that test days, field trips, visiting speakers, etc., will need to be avoided. Also, to cut down on travel and time, it would be desirable to observe three or more teacher's classes in your school during each visit.

The attached sheet more fully describes the project and your responsibilities to it.

Thank you for your participation. If you have any questions, call collect (606-257-5997).

Sincerely,

Clayton P. Omvig, Chairman
Department of Vocational Education

CPO/pd

AN EQUAL OPPORTUNITY UNIVERSITY

TEACHER INFORMATION SHEET

CLASSROOM INTERACTION PROJECT

Purpose of the Project:

To collect baseline data relative to the operation of co-educational classes in vocational education. There currently exists a body of knowledge relative to student/teacher interaction in general education settings and in sexually segregated classes. However, no such data exist for vocational education. The purpose of this study will be to provide such a data base.

Your Responsibility as a Cooperating Teacher:

1. Allow an individual trained in classroom observation techniques to visit your class three times.
2. Provide this individual with a chair in the rear of the room.
3. Teach your class as usual.
4. Provide some demographic data, such as: age, years, teaching experience, degrees held, etc.

As I indicated in the attached letter, this is in no way an evaluation. No individual classroom data will be analyzed.

Responsibilities of the Classroom Observer:

1. Merely record classroom activities on a predesigned form.
2. Make no judgments, no interruptions, no comments.
3. Try his/her best not to be a distraction to the normal classroom routine.

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APPENDIX B

Teacher Data Form

TEACHER DATA FORM

CLASSROOM INTERACTION PROJECT

Teacher _____ School _____

Sex _____ F _____ M Vocational Area _____

-Classes Taught-

	Time (A.M. or P.M.)		Name of Class	Full-Year Class		Student Population (Number of)	
				Yes	No	Males	Females
1.	____	to ____	_____	___	___	_____	_____
2.	____	to ____	_____	___	___	_____	_____
3.		to					
4.	____	to ____	_____	___	___	_____	_____
5.	____	to ____	_____	___	___	_____	_____
6.	____	to ____	_____	___	___	_____	_____
7.	___	to ___	_____	___	___	_____	_____

Return to: _____

Classroom Interaction Project
Department of Vocational Education
College of Education
University of Kentucky
Lexington, KY 40506-0017

APPENDIX C

Correspondence with Regional Vocational Directors

UNIVERSITY OF KENTUCKY
LEXINGTON, KENTUCKY 40506-0017

COLLEGE OF EDUCATION
VOCATIONAL EDUCATION
43 DICKEY HALL

February 1, 1989

Regional Vocational Director

Dear :

During the past two weeks I called each region to alert you to a state-sponsored research project and to solicit your assistance in that project. In three cases I spoke with a regional coordinator or a state school principal due to illness or your being away from your office.

The purpose of this follow-up letter is to thank you for your cooperation (every region was positive about working with us) and to provide you with information relative to our specific needs.

The project is designed to assess teacher-student interaction patterns in Vocational Education classrooms. It is a descriptive study which will involve 2 or 3, 45 minute observations of selected classrooms. There will be no evaluation of the teachers and no classroom participation by the observer. The people who have been trained to observe will simply sit in on the class and record interaction patterns of students and teachers. There is no "good" or "bad" score. We only wish to establish some baseline data from our postsecondary programs. Individual classroom data will be anonymous.

Specifically, what I need each region to coordinate is the identification of teachers who work with classes which contain both men and women (at least a 70-30 mix would be desirable). Additionally, these groups of students should be visited while they are participating in a lecture/discussion situation rather than during independent work in a shop or lab.

AN EQUAL OPPORTUNITY UNIVERSITY

Would you please alert your state-school principal to our project and use whatever means you feel appropriate in your region to identify potential teachers who might participate? Since the classroom schedules and activities might vary a great extent in the postsecondary programs, we will contact those teachers personally to determine the best dates and times to visit.

My final question regards procedure and/or an appropriate contact person for identifying teachers. After speaking with most of you, I'm sure that this will vary from region to region. To simplify the process, let me propose the following. If I have not heard from you or your designate by phone or letter by February 10th, I (or Ms. Debbie Boone, who is assisting with the project) will call. In that we will be visiting the state schools, I assume that the Principals will be the person we need to ultimately contact, but I leave the process in your hands; we don't want to impose or cause any disruption to your classes.

I sincerely thank you for your assistance and promise to forward each region a copy of the final report of the project. Also, It was good to speak with so many of you on the phone. Schedules and changes in responsibility have not allowed me to be around the state as much as I once was. I have to confess that more than one of the calls about the project lasted over 45 minutes. reminiscing about our 20 + years in Vocational Education in Kentucky was great.

We wait to hear from each region as to how we should proceed with our project.

Sincerely,

Clayton P. Omvig, Chairman
Department of Vocational Education

lc

cc: State School Principals
Regional Coordinators

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APPENDIX D

INTERSECT Observation Instruments

TEACHER DATA SHEET

Classroom Interaction Project

1. _____ 2. _____
(Name) (School)

3. _____ years teaching experience (count this year)

4. Education: (Check one and complete as necessary)

_____ BA/BS (Rank III)
_____ BA/BS + _____
_____ MA/MS (Rank II)
_____ MA/MS + _____
_____ Rank I
_____ Rank I + _____
_____ Specialist in Education
_____ Doctorate

5. Certification held besides your vocational teacher (if any)

_____ No other
_____ Instructional Supervisor
_____ Principal
_____ Counselor
_____ Other: _____

6. I would rate my business/industry work experience as:

_____ a. Minimal
_____ b. Adequate -- sufficient for that required for my vocational certification
_____ c. More than necessary for my certification
_____ d. Extensive -- four or more years

7. Have you ever had any special training in classroom interaction strategies: _____ Yes _____ No

If yes: Specify _____
_____

Thanks for your cooperation. I trust that your participation in the project has gone/will go well.

Observer	Date	School	Grade Level	# ID

Time _____ Subject/Teaching Content _____

1	2	3	4	5	6	7	8	9	10
Teacher Initiates to:	BY	Student Initiates	IN	Praise	Accept	Remediate	Criticize	Comment	Ancillary Teacher Behavior
M F G R B W H A O	HAND RAISE CALL OUT	M F G R B W H A O	Private	P-I P-C P-App^W P-O	A-I A-C A-App^W A-O	R-I R-C R-App^W R-O	C-I C-C C-App^W C-O		Attribution A Eff X Short Circuit: Physical Verbal
M F G R B W H A O	HAND RAISE CALL OUT	M F G R B W H A O	Private	P-I P-C P-App^W P-O	A-I A-C A-App^W A-O	R-I R-C R-App^W R-O	C-I C-C C-App^W C-O		Attribution A Eff X Short Circuit: Physical Verbal
M F G R B W H A O	HAND RAISE CALL OUT	M F G R B W H A O	Private	P-I P-C P-App^W P-O	A-I A-C A-App^W A-O	R-I R-C R-App^W R-O	C-I C-C C-App^W C-O		Attribution A Eff X Short Circuit: Physical Verbal
M F G R B W H A O	HAND RAISE CALL OUT	M F G R B W H A O	Private	P-I P-C P-App^W P-O	A-I A-C A-App^W A-O	R-I R-C R-App^W R-O	C-I C-C C-App^W C-O		Attribution A Eff X Short Circuit: Physical Verbal
M F G R B W H A O	HAND RAISE CALL OUT	M F G R B W H A O	Private	P-I P-C P-App^W P-O	A-I A-C A-App^W A-O	R-I R-C R-App^W R-O	C-I C-C C-App^W C-O		Attribution A Eff X Short Circuit: Physical Verbal
M F G R B W H A O	HAND RAISE CALL OUT	M F G R B W H A O	Private	P-I P-C P-App^W P-O	A-I A-C A-App^W A-O	R-I R-C R-App^W R-O	C-I C-C C-App^W C-O		Attribution A Eff X Short Circuit: Physical Verbal
M F G R B W H A O	HAND RAISE CALL OUT	M F G R B W H A O	Private	P-I P-C P-App^W P-O	A-I A-C A-App^W A-O	R-I R-C R-App^W R-O	C-I C-C C-App^W C-O		Attribution A Eff X Short Circuit: Physical Verbal
M F G R B W H A O	HAND RAISE CALL OUT	M F G R B W H A O	Private	P-I P-C P-App^W P-O	A-I A-C A-App^W A-O	R-I R-C R-App^W R-O	C-I C-C C-App^W C-O		Attribution A Eff X Short Circuit: Physical Verbal
M F G R B W H A O	HAND RAISE CALL OUT	M F G R B W H A O	Private	P-I P-C P-App^W P-O	A-I A-C A-App^W A-O	R-I R-C R-App^W R-O	C-I C-C C-App^W C-O		Attribution A Eff X Short Circuit: Physical Verbal

Observer	Date	Time of Entry	School	Grade Level	ID=

DIAGRAM OF CLASSROOM SEATING ARRANGEMENT

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OBSERVATION TALLY SHEET

School_____ Class_____ Teacher___M or___F

Date of Observation_____

1. No. of interactions with MW students_____.
2. No. of interactions with MB students_____. Total of No. 1 & 2_____.
3. No. of interactions with FW students _____ .
4. No. of interactions with FB students _____ . Total of No. 3 & 4 _____.
5. No. of acceptance interactions _____.
6. No. of remediate interactions _____.
7. No. of praise interactions _____.
8. No. of criticism interactions _____ .
9. No. of student initiated interactions_____.
10. No. of conduct interactions_____.
11. No. of group interactions_____.
12. Other interactions:

_____

_____

_____

_____

Signature of Observer

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APPENDIX E

Summary Tables of Data Analyses

Table 18

Mean Differences of Secondary and Postsecondary Teachers' Interactions Per Male and Female Students

Interaction Variables		Instructional Level: Secondary (n=62)	Instructional Level: Postsecondary (n=22)	p
Praise				
Per Male Students	M	.08	.08	.97
	SD	.17	.21	
Per Female Students	M	.02	.18	.008*
	SD	.06	.45	
Remediation				
Per Male Students	M	.87	.63	.33
	SD	1.08	.66	
Per Female Students	M	.52	1.10	.03*
	SD	.63	1.88	
Acceptance				
Per Male Students	M	1.55	1.07	.23
	SD	1.74	1.14	
Per Female Students	M	.87	1.61	.03*
	SD	.88	2.35	
Criticism				
Per Male Students	M	.11	.02	.01*
	SD	.16	.05	
Per Female Students	M	.0003	.00	.55
	SD	.002	.00	

*$p < .05$

Table 19

Equity of Student Interactions By
Secondary and Postsecondary Teachers

Interaction Variable By Instructional Level	M/F Mean Difference	Standard Deviation	t-value	p
Secondary Level Teachers				
Praise	.05	.17	2.48	.01*
Remediation	.35	1.39	2.01	.04*
Acceptance	.68	2.27	2.35	.02*
Criticism	.11	.16	5.55	.001*
Postsecondary Level Teachers				
Praise	-.10	0.44	-1.11	.28
Remediation	-.46	2.12	-1.03	.31
Acceptance	.54	2.95	-0.86	.39
Criticism	.02	0.05	1.93	.06

*$p < .05$

Table 20

Mean Differences Between Male and Female Secondary Teachers on Interactions Per Male and Female Students

Interactions per Student		Secondary Teachers: Males (n=62)	Secondary Teachers: Females (n=22)	p
Praise				
Per Male Students	M	.10	.07	.53
	SD	.22	.14	
Per Female Students	M	.03	.01	.08
	SD	.08	.05	
Remediation				
Per Male Students	M	.03	1.07	.08
	SD	.64	1.28	
Per Female Students	M	.58	.47	.50
	SD	.68	.60	
Acceptance				
Per Male Students	M	1.61	1.51	.83
	SD	1.92	1.61	
Per Female Students	M	1.09	.72	.10
	SD	1.07	.70	
Criticism				
Per Male Students	M	.08	.14	.14
	SD	.13	.18	
Per Female Students	M	.000	.000	...
	SD	.000	.000	

Table 21

Mean Differences Between Male and Female Postsecondary Teachers On Interactions Per Male and Female Students

Interaction Per Students		Postsecondary Teachers: Males (n=10)	Postsecondary Teachers: Females (n=12)	p
Praise/Male	M	.13	.03	.30
	SD	.31	.09	
Praise/Female	M	.15	.21	.76
	SD	.27	.57	
Remediation/Male	M	.54	.71	.57
	SD	.44	.82	
Remeditation/Female	M	.96	1.22	.75
	SD	.74	2.50	
Acceptance/Male	M	1.01	1.12	.83
	SD	.75	1.42	
Acceptance/Female	M	1.28	1.88	.56
	SD	1.10	3.07	
Criticism/Male	M	.007	.03	.23
	SD	.022	.07	
Criticism/Female	M	.00	.00	--
	SD	.00	.00	

Table 22

Differences Between Interactions Per Male and Interactions Per Female Students By Male and Female Teachers of the Secondary Level

Interactions		Secondary Teachers Male (n=26)	Secondary Teachers Female (n=36)
Praise	M difference*	.06	.05
	SD	.24	.11
	t-value	1.30	2.70
	p	.20	.01**
Remediation	M difference*	.01	.60
	SD	1.07	1.55
	t-value	.06	2.33
	p	.95	.02**
Acceptance	M difference*	.52	79
	SD	2.64	1.99
	t-value	1.01	2.39
	p	.32	.02**
Criticism	M difference*	.08	.14
	SD	.13	.18
	t-value	3.11	4.68
	p	.004**	.0001**

*Difference between interactions per male and interactions per female students.

**$p < .05$

Table 23

Differences Between Interactions Per Male and Interactions Per Female Students By Male and Female Teachers at the Postsecondary Level

Interactions		Postsecondary Teachers Male (n=10)	Female (n=22)
Praise	M difference*	-.01	-.17
	SD	.09	.59
	t-value	-.64	-1.02
	p	.53	.32
Remediation	M difference*	-.41	.51
	SD	.98	2.79
	t-value	-1.33	-.63
	p	.21	.54
Acceptance	M difference*	-.27	-.76
	SD	1.54	3.81
	t-value	-.55	-.70
	p	.59	.50
Criticism	M difference*	.007	.03
	SD	.02	.07
	t-value	1.00	1.76
	p	.34	.10

*Difference between interactions per male and interactions per female students.

Table 24

Mean Differences Between Male and Female Teachers
On Interactions Per Male and Female Students

Interactions Per Students		Males (n=36)	Females (n=48)	F value	p
Praise/Male	M	.11	.06	1.28	.26
	SD	.24	.13		
Praise/Female	M	.07	.06	.00	.96
	SD	.16	.29		
Remediation/Male	M	.58	.98	3.43	.06
	SD	.59	1.19		
Remeditation/Female	M	.69	.66	.01	.90
	SD	.71	1.36		
Acceptance/Male	M	1.44	1.41	.01	.93
	SD	1.69	1.56		
Acceptance/Female	M	1.14	1.01	.17	.68
	SD	1.06	1.68		
Criticism/Male	M	.06	.11	2.94	.09
		.11	.17		
Criticism/Female	M	.0005	.0000	1.34	.25
	SD	.003	.0000		

df (1,82)

Table 25

Mean Differences Between Interactions Per
Male and Female Students By
Male and Female Teachers

Interactions		Secondary Teachers Male (n=36)	Secondary Teachers Female (n=48)
Praise	M difference*	.03	.004
	SD	.32	.21
	t-value	1.11	-.10
	p	.27	.91
Remediation	M difference*	-.10	.32
	SD	1.05	1.96
	t-value	-.60	1.14
	p	.55	.25
Acceptance	M difference*	.30	.40
	SD	2.39	2.61
	t-value	.76	1.07
	p	.45	.28
Criticism	M difference*	.06	.11
	SD	.11	.17
	t-value	3.09	4.78
	p	.004**	.0001**

*Difference between interactions per male and interactions per female students.

**$p < .05$

Table 26

Interaction Means and Standard Deviations For Three Teacher Experience Groups

Interaction Variables		Teacher Experience Groups Group 1 (1-9 yrs)	Group 2 (10-15 yrs)	Group 3 (16+ years)
Praise				
Per Male Students	M	.04	.11	.09
	SD	.06	.24	.20
Per Female Students	M	.03	.15	.01
	SD	.07	.40	.03
Remediation				
Per Male Students	M	.52	.76	1.13
	SD	.59	.81	1.34
Per Female Students	M	.38	.86	.75
	SD	.44	1.72	.75
Acceptance				
Per Male Students	M	1.02	1.63	1.61
	SD	.78	1.83	1.91
Per Female Students	M	.73	1.50	.96
	SD	.81	2.16	.87
Criticism				
Per Male Students	M	.05	.12	.10
	SD	.11	.18	.14
Per Female Students	M	.0007	.000	.000
	SD	.003	.000	.000

Table 27

Summary of Analysis of Variance Results for all Interaction Variables Comparing Teacher Experience Groups

Interaction Variable	df	F value	p
Praise			
Per Male Student	(2,79)	1.12	.33 n.s.*
Per Female Student	(2,79)	2.86	.06 n.s.
Remediation			
Per Male Student	(2.79)	2.74	.07 n.s.
Per Female Student	(2,79)	1.37	.26 n.s.
Acceptance			
Per Male Student	(2,79)	1.28	.28 n.s.
Per Female Student	(2,79)	2.08	.13 n.s.
Criticism			
Per Male Student	(2,79)	1.70	.18 n.s.
Per Female Student	(2,79)	1.06	.35 n.s.

*n.s=not significant

Table 28

Mean Differences Between Interactions Per Male and Per Female Students By Teacher Experience Groups

Interactions		Teacher Experience Groups* Group 1 (n=26)	Group 2 (n=28)	Group 3 (n=29)
Praise	M difference**	.005	-.04	.07
	SD	.06	.42	.21
	t-value	.45	-.51	1.87
	P	.65	.61	.07
Remediation	M difference**	.13	-.10	.37
	SD	.81	2.10	1.72
	t-value	.89	-.27	1.18
	P	.38	.79	.24
Acceptance	M difference**	.28	.13	.64
	SD	1.30	3.29	2.54
	t-value	1.14	.21	1.38
	P	.26	.83	.17
Criticism	M difference**	.05	.12	.10
	SD	.11	.18	.14
	t-value	2.27	3.60	3.82
	P	.03***	.001***	.0007***

*Group 1 = 1-9 years experience, Group 2 = 10-15 years experience, Group 3 = 16 + years experience.

**Difference between interactions per male and interactions per female students.

***$p < .05$

Table 29

Means and Standard Deviations of Teacher Interactions Per Male and Per Female students By Teacher Education Groups

Interaction Variables		Teacher Education Groups* Group 1 (n=18)	Group 2 (n=38)	Group 3 (n=27)
Praise				
Per Male Students	M	.07	.09	.06
	SD	.12	.24	.13
Per Female Students	M	.14	.06	.02
	SD	.47	.16	.04
Remediation				
Per Male Students	M	.77	.96	.65
	SD	1.04	1.11	.77
Per Female Students	M	1.02	.61	.53
	SD	2.10	.66	.63
Acceptance				
Per Male Students	M	1.37	1.37	1.55
	SD	1.27	1.66	1.81
Per Female Students	M	1.55	.93	.95
	SD	2.60	.91	.91
Criticism				
Per Male Students	M	.09	.08	.10
	SD	.14	.13	.17
Per Female Students	M	.000	.0005	.000
	SD	.000	.003	.000

Wilks' Criterion Lambda = 0.86, $F(16, 146) = 0.68$, $p < 0.81$

*Group 1 = Industrial Teaching Certificate, BA/BS, BA/BS plus additional credits, Rank 3.

Group 2 = MA/MS, MA/MS plus additional credits, Rank 2.

Group 3 = Rank 1, Rank 1 plus additional credits, Specialist Degree.

Table 30

Mean and Standard Deviations of Interaction Differences Between Male and Female Students By Teacher's Education Level

Interactions		Teacher's Education Level* Group 1 (n=18)	Group 2 (n=38)	Group 3 (n=27)
Praise	M difference**	-.06	.03	.03
	SD	.50	.21	.11
	t-value	-.58	1.00	1.75
	p	.57	.32	.09
Remediation	M difference**	-.25	.35	.11
	SD	2.62	1.36	1.14
	t-value	-.41	1.59	.53
	p	.69	.11	.60
Acceptance	M difference**	-.17	.44	.60
	SD	3.37	2.24	2.26
	t-value	-.22	1.22	1.38
	p	.82	.23	.18
Criticism	M difference**	.09	.08	.10
	SD	1.14	.13	.17
	t-value	2.69	3.88	3.05
	p	.01***	.0004***	.005***

*Group 1 = Industrial Teaching Certificate, BA/BS, BA/BS plus additional credits, Rank 3; Group 2 = MA/MS plus additional credits, Rank 2; Group 3 = Rank 1, Rank 1 plus additional credits, Specialist Degree.
**Difference between interactions per male and interactions per female students.
***$p < .05$

Table 31

Means and Standard Deviations of Teacher Interactions Per Male and Female Students By Teacher Certification Level

Interaction Variables		Teacher Certification Level* Level 1 (n=42)	Level 2 (n=11)	Level 3 (n=14)
Praise				
Per Male Students	M	.07	.02	.03
	SD	.13	.05	.04
Per Female Students	M	.04	.19	.04
	SD	.10	.59	.06
Remediation				
Per Male Students	M	.85	.34	.64
	SD	1.00	.57	.90
Per Female Students	M	.64	1.36	.58
	SD	.73	2.60	.51
Acceptance				
Per Male Students	M	1.59	.58	.91
	SD	1.69	.42	.85
Per Female Students	M	1.00	1.98	1.15
	SD	.98	3.05	1.20
Criticism				
Per Male Students	M	.12	.03	.03
	SD	.18	.06	.07
Per Female Students	M	.00	.00	.001
	SD	.00	.00	.005

Wilks' Criterion Lambda = 0.69, F(24, 122) = 1.01, $p < 0.45$
*Level 1 = No additional certificate
Level 2 = Instructional Supervisor, Principal, or Counselor Certificate
Level 3 = Other additional certificate

Table 32

Mean Teacher Interaction Differences Between Male and Female Students By Teacher Certification Level

Interaction Variables		Teacher Certification Level* Level 1 (n=42)	Level 2 (n=11)	Level 2 (n=14)
Praise	M difference**	.03	-.05	-.004
	SD	.15	.65	.07
	t-value	1.35	-.32	-.22
	p	.18	.75	.83
Remediation	M difference**	.36	-.63	.06
	SD	1.53	2.66	1.09
	t-value	1.61	-.86	.22
	p	.11	.40	.82
Acceptance	M difference**	.72	-.46	-.09
	SD	2.23	4.07	1.77
	t-value	2.21	-.41	-.20
	p	.03***	.68	.84
Criticism	M difference**	.12	.04	.04
	SD	.18	.07	.07
	t-value	4.72	2.23	2.01
	p	.0001***	.04***	.06

*Level 1 = No additional certificate.
Level 2 = Instructional Supervisor, Principal, or Counselor Certificate.
Level 3 = Other additional certificates.
**Difference between interactions per male and interactions per female students.
***$p < .05$

Table 33

Means and Standard Deviations of Teacher Interactions Per Male and Per Female Students By Teacher Work Experience

Interaction Variables		Teacher Work Experience* Group 1 (n=10)	Group 2 (n=19)	Group 3 (n=20)	Group 4 (n=30)
Praise					
Per Male Students	M	.01	.06	.10	.09
	SD	.03	.15	.24	.20
Per Female Students	M	.04	.03	.13	.06
	SD	.12	.10	.44	.16
Remediation					
Per Male Students	M	.64	.58	.81	.83
	SD	.87	.70	.86	1.06
Per Female Students	M	.56	.62	.89	.61
	SD	.73	.75	1.85	.69
Acceptance					
Per Male Students	M	1.02	1.46	1.49	1.42
	SD	1.53	1.90	2.01	1.21
Per Female Students	M	1.04	.93	1.73	.85
	SD	.93	.85	2.52	.79
Criticism					
Per Male Students	M	.05	.12	.06	.10
	SD	.10	.17	.06	.18
Per Female Students	M	.00	.00	.00	.0006
	SD	.00	.00	.00	.003

Wilks' Criterion Lambda = 0.76, F(24,197.82)=0.81, p< 0.72
*Group 1 = Minimal experience
Group 2 = Adequate for certification
Group 3 = More experience than necessary for certification
Group 4 = Extensive experience, 4 or more years

Table 34

Mean Teacher Interaction Differences Between Male and Female Students By Teacher Work Experience

Interaction Variables		Teacher Work Experience Groups*			
		Group 1 (n=10)	Group 2 (n=19)	Group 3 (n=20)	Group 4 (n=30)
Praise	M difference**	-.03	.03	-.02	.03
	SD	.13	.16	.53	.11
	t-value	-.75	.83	-.25	1.72
	p	.46	.41	.80	.09
Remediation	M difference**	.08	-.04	-.08	.21
	SD	1.33	.89	2.37	1.42
	t-value	.19	-.20	-.16	.82
	p	.85	.84	.87	.42
Acceptance	M difference**	-.01	.52	-.23	.57
	SD	2.27	2.20	3.81	1.71
	t-value	-.03	1.04	-.27	1.83
	p	.97	.31	.78	.07
Criticism	M difference**	.05	.12	.06	.10
	SD	.10	.17	.09	.18
	t-value	1.60	3.01	3.00	3.20
	p	.14	.007***	.007***	.003***

*Group 1 = Minimal experience
Group 2 = Adequate for certification
Group 3 = More experience than necessary for certification
Group 4 = Extensive experience, 4 or more years

**Difference between interactions per male and interactions per female students.

***$p < .05$

Table 35

Means, Standard Deviations, and Analysis of Variance Results of Teacher Interactions Per Male and Per Female Students By Teacher Training in Classroom Interaction Strategies

Interaction Variables		Teacher Interaction Training Groups: Trained Teachers (n=27)	Untrained Teachers (n=56)	F value*	p
Praise					
Per Male Students	M	.09	.06	.44	.50
	SD	.19	.19		
Per Female Students	M	.03	.14	4.03	.04**
	SD	.08	41		
Remediation					
Per Male Students	M	.93	.57	2.39	.12
	SD	.96	1.05		
Per Female Students	M	.49	1.05	4.70	.03**
	SD	.57	1.76		
Acceptance					
Per Male Students	M	1.65	.98	3.21	.07
	SD	1.78	1.12		
Per Female Students	M	.82	1.60	5.48	.02**
	SD	.89	2.14		
Criticism					
Per Male Students	M	.11	.05	3.08	.08
	SD	.16	.12		
Per Female Students	M	.0003	.00	.48	.49
	SD	.002	.00	.00	

*df(1,81)
**p < .05 level.

Table 36

Mean Teacher Interaction Differences Between Male and Female Students By Teacher Training in Classroom Interaction Strategies

Interaction Variables		Teacher Interaction Training Groups: Trained Teachers (n=27)	Untrained Teachers (n=56)
Praise	M difference*	.08	.06
	SD	.39	.19
	t-value	-1.08	2.38
	p	.28	.02**
Remediation	M difference*	.47	.44
	SD	2.22	1.20
	t-value	-1.11	2.76
	p	.27	.007**
Acceptance	M difference*	-.61	.83
	SD	2.74	2.29
	t-value	-1.17	2.72
	p	.25	.008**
Criticism	M difference*	.05	.11
	SD	.12	.16
	t-value	2.21	5.28
	p	.03	.0001

*Difference between interactions per male and interactions per female students.

**$p < .05$

Table 37

Mean Teacher Interaction Differences Between Male and Female Students By Trained and Untrained Secondary and Postsecondary Teachers

Interaction Variables	Teacher Interaction Training Groups			
	Trained Secondary (n=15)	Untrained Secondary (n=46)	Trained Postsecondary (n=12)	Untrained Postsecondary (n=10)
Praise				
M difference**	.01	.07	-.20	.01
SD	.06	.20	.58	.12
t-value	.85	2.36	-1.22	.41
p	.41	.02**	.24	.68
Remediation				
M difference**	-.06	.50	-.98	.16
SD	1.88	1.20	2.58	1.24
t-value	-.14	2.65	-1.32	.41
p	.88	.006**	.21	.69
Acceptance				
M difference**	-.04	.92	-1.33	.40
SD	2.21	2.29	3.24	2.37
t-value	-.08	2.74	-1.42	.54
p	.93	.008**	.18	.60
Criticism				
M difference**	.07	.13	.02	.02
SD	.15	.17	.06	.04
t-value	1.88	5.33	1.29	1.49
p	.08	.0001**	.22	.17

*Difference between interactions per male and interactions per female students.

**$p < .05$

Table 38

Means, Standard Deviations of Teacher Interactions Per Male and Per Female Students By Vocational Education Areas

Interaction Variables		Vocational Education Areas* Area 1 (n=14)	Area 2 (n=9)	Area 3 (n=31)	Area 4 (n=13)	Area 5 (n=9)
Praise						
Per Male Students	M	.02	.06	.08	.10	.04
	SD	.04	.12	.15	.27	.08
Per Female Students	M	.01	.03	.03	.28	.03
	SD	.02	.05	.08	.57	.11
Remediation						
Per Male Students	M	.66	.56	.97	.58	.71
	SD	.96	.52	1.10	.69	.65
Per Female Students	M	.61	.70	.47	1.43	.62
	SD	.73	.88	.54	2.36	.68
Acceptance						
Per Male Students	M	.77	1.99	1.51	1.26	.79
	SD	1.37	1.83	1.54	1.36	.70
Per Female Students	M	1.12	1.23	.86	1.99	1.07
	SD	.80	1.43	.81	2.91	1.15
Criticism						
Per Male Students	M	.06	.12	.14	.01	.03
	SD	.09	.19	.19	.03	.07
Per Female Students	M	.00	.00	.0006	.00	.00
	SD	.00	.00	.003	.00	.00

Wilks' Criterion Lambda = 0.58, F(24,273.05) = 0.90, $p < 0.63$
*Area 1 = Home Economics
Area 2 = Agriculture
Area 3 = Business
Area 4 = Postsecondary Technical
Area 5 = Postsecondary Support

Table 39

Mean Teacher Interaction Differences Between Male and Female Students By Trained and Untrained Secondary and Postsecondary Teachers

Interaction Variables		Vocational Education Areas*				
		Area 1 (n=14)	Area 2 (n=9)	Area 3 (n=31)	Area 4 (n=13)	Area 5 (n=9)
Praise						
	M difference**	.01	.03	.04	-.17	.001
	SD	.05	.12	.14	.57	.06
	t-value	.71	.77	1.85	-1.12	.09
	p	.49	.46	.07	.28	.93
Remediation						
	M difference**	.05	-.14	.39	-.84	.08
	SD	1.43	1.18	1.29	2.67	.70
	t-value	.13	-.35	1.70	-1.14	.36
	p	.89	.73	.09	.27	.73
Acceptance						
	M difference**	-.34	.75	.65	-.72	-.27
	SD	1.99	2.87	1.96	3.68	1.54
	t-value	.63	.75	1.85	-.71	-.53
	p	.54	.47	.07	.49	.60
Criticism						
	M difference**	.06	.12	.14	.01	.03
	SD	.09	.19	.19	.03	.07
	t-value	2.55	1.79	4.03	1.46	1.43
	p	.02***	.11	.0003***	.17	.19

*Area 1 = Home Economics
Area 2 = Agriculture
Area 3 = Business
Area 4 = Postsecondary Technical
Area 5 = Postsecondary Support

**Difference between interactions per male and interactions per female students.

***$p < .05$